

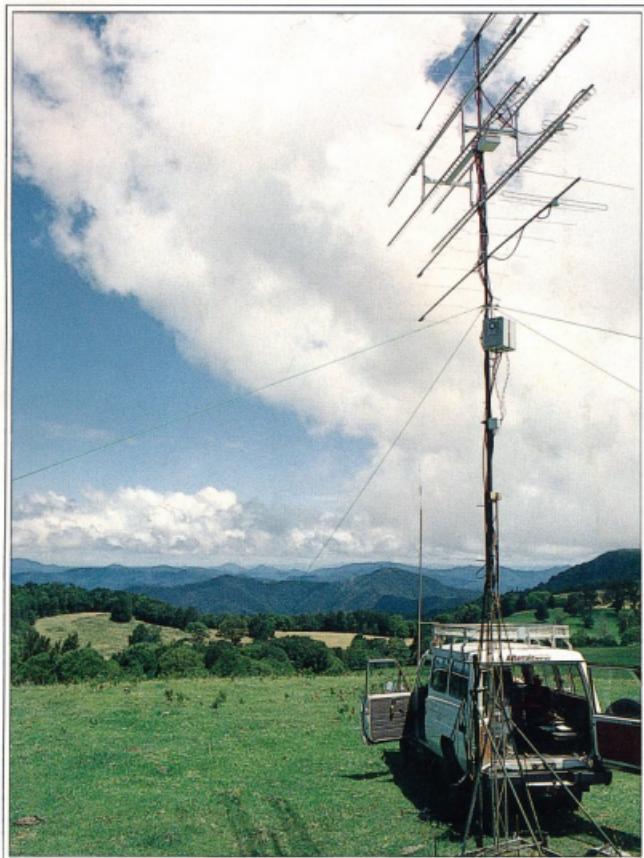
# RADIO

## AMATEUR

DECEMBER 1994  
Volume 62 No 12



*Journal of the Wireless Institute of Australia*



### IN THIS ISSUE:

- Review of ICOM IC-738 HF Transceiver
- Transportable Tiltover Tower
- PLL Carrier Detector for 7910 Packet Modem
- The Cradbog Charger

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### Cover

Are you ready for the 1995 VHF-UHF Field Day which will take place on 14-15 January 1995? Doug Friend VK4OE operated portable at Dorrigo in NSW in the 1994 VHF-UHF Field Day, and will be active in the 1995 Field Day. Of special interest in Doug's 1994 Field Day station was the array of four loop Yagis for 1296 MHz, with a homebrew mast-head power amplifier using four Mitsubishi M57762 power modules.

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## Federal QSP

Perhaps, since this is effectively the Christmas issue, I might be permitted to say something about religion. "What!" I hear you say. "Bring religion into Christmas? Whatever next?"

I was fortunate enough to have grown up in those halcyon days when inflation was a constant and predictable low percentage and there was something called the basic wage linked to the cost-of-living. So you could be sure that anything bought on hire purchase would be paid for by regular wage increases. There were more vacancies than people to fill them and everyone leaving school was certain of a job. Anyone who had the ability and wanted to go to university was guaranteed a place and it was as close to being free as could be.

We are told that things had to change because the tariff barriers which were protecting Australian industry made it very inefficient, so that it was costing the taxpayer a lot. Was it costing the taxpayer more, I wonder, than the ten percent unemployment we seem to have exchanged it for?

But how things have changed. Now everyone has to compete for the few jobs in a manner reminiscent of the Chicago meatworks in 1922. Only those with an aggregate score above a particular value are able to compete with each other for the limited university and college places. Nursing is no longer a vocation and the places for student nurses are reserved for those with the best marks in maths and physics. Our judicial system has always been an adversarial system where, instead of seeking for the truth, the better presented case will be the winner. Everything seems to be competitive and polarised. If I have the job, you haven't. If you are right, then I must be wrong. Disagreement is everywhere. This is no less true of the amateur movement and has even been known to occur within the WIA Federal Council!

So I come at last to religion and the religion I want to talk about is the Quakers or The Religious Society of Friends to give them their full name. If they have a disagreement or a problem they refuse to settle it by a majority vote and leave a minority feeling disgruntled. Nor are they satisfied to achieve a consensus, which is only another way of saying compromise, in which no one is completely satisfied. They will go on talking until they find a solution which everyone can conscientiously accept. And the unexpected delight of all this is that often a novel and original solution will emerge that would not otherwise have been thought of.

Could we not as amateurs move against the trend to confrontation and settle our differences by looking for what is good or rational or acceptable in each others' position and try, for as long as it takes, to build on it to achieve a true agreement. This could be good practice to prepare

for the SMA's intended policy on the resolution of interference issues. No longer will we be able to adopt a holier-than-thou attitude and too bad for the neighbour so long as our transmissions are clean. The SMA will expect the parties to resolve the problem by mutual agreement and assistance, with the SMA acting as a consultant. If the problem remains unresolved it may act as arbitrator or refer the parties to a conciliator.

Something else which has changed is the meaning of the word "merry". In the original meaning of the word, I wish you all a Merry Christmas.

**Bruce Hedland-Thomas VK6OO  
VK6 Federal Councillor  
ar**

# Editor's Comment

## Consensus

I am about to confess to shameless plagiarism of the theme of Bruce Hedland-Thomas on the adjacent page, because it is so appropriate to our present situation, be it in employment, local, State or Federal government, and even, as Bruce says, in WIA affairs.

It was at the October meeting of Federal Council that Bruce gave me his draft QSP, and I suspect that he, as well as I, thought much about its

aptness as discussions proceeded. I would differ slightly about the meaning of the word "consensus", though. I feel it implies something more praiseworthy than "compromise", being in fact the best way of resolving all differences.

Bruce refers to society these days being "polarised", and again his assessment is "spot on". It is a fact that few things are entirely right and few entirely wrong, but usually fall somewhere on the grey-scale spectrum in between. Most of the world's problems are caused by those who doggedly insist on identifying with the extremes.

May I also wish you all a very merry Christmas and a happy New Year.

**Bill Rice VK3ABP  
Editor  
ar**

## WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

Division	Address	Officers	Weekly News Broadcasts			1995 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Rob Apathy Secretary Len Jones Treasurer Don Hume	VK1KRA VK1NLJ VK1DH	3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.		(F) \$70.00 (G) (\$S) \$56.00 (X) \$42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Freecall 1800 817 644 Fax (02) 633 1525	President Michael Corbin Secretary Pixie Chappie Treasurer Terry Ryeland (Office hours Mon-Fri 11.00-14.00 Mon 1900-2100)	VK2PFO VK2KPC VK2UX	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.595 plus 10 m, 2m, 70 cm, 23 cm. Voicemail highlights on (02) 724 8793. The broadcast text is available on packet.		(F) \$66.75 (G) (\$S) \$53.40 (X) \$38.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Jim Linton Secretary Barry Wilton Treasurer Rob Hailey (Office hours Tue & Thur 0830-1530)	VK3PC VK3XV VK3XLZ	1.840MHz 3.615 LSB, 7.085 LSB, 53.900FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Milicure, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonards 1030 hrs on Sunday.		\$72.00 (\$G) (\$S) \$58.00 (X) \$44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Murray Kelly Secretary Lance Bickford Treasurer Roger Bingham	VK4AOK VK4AZ VK4HD	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday.		\$72.00 (\$G) (\$S) \$58.00 (X) \$44.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Garry Herden Secretary Maurie Hooper Treasurer Bill Wardrop	VK5ZK VK5EA VK5AQM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATCh 34 579.000 Adelaide, 147.225(R) Mt Barker, 146.825(R) Mt Barker broadcast repeated on 7065, 10125, 146.700, 0900 hrs Sunday.		\$72.00 (\$G) (\$S) \$58.00 (X) \$44.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 434 3283	President Cliff Bastin Secretary Ray Sparro Treasurer Bruce Hedland-Thomas	VK6LZ VK6RR VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.		\$60.75 (\$G) (\$S) \$48.60 (X) \$32.75
VK7	Tasmanian Division 148 Derwent Avenue Lindisfarne TAS 7015 Phone (002) 43 8435	President Andrew Dixon Secretary Ted Beard Treasurer Phil Harbeck	VK7GL VK7EB VK7PU	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 146.700 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs.		\$69.00 (\$G) (\$S) \$55.65 (X) \$40.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).				Membership Grades Full (F) Pension (G) Needy (G) Student (S) Non receipt of AR (X)	Three-year membership available to (F) (G) grades at fee x 3 times.

Note: All times are local. All frequencies MHz.

## ■ Equipment Review

# ICOM IC-738 All Mode HF Transceiver

Reviewed by Ron Fisher VK3OM\*

As the saying goes, "when you're on a good thing, stick to it". At the same time, however, a few updates and improvements will never go astray. First, there was the IC-737 which I reviewed in the August 1993 issue of *Amateur Radio*. Then, with a few slight changes, the IC-737A. Now, with even more improvements, the IC-738.

Let's look at the first two quickly and then the new IC-738 in detail. Of course in between all of these, ICOM brought out the IC-736 which I reviewed in the July 1994 issue of our magazine. All four transceivers are closely related and from a distance would be impossible to pick apart.

Back to the beginning. The IC-737 was a high performance rig which lacked a few desirable features such as VOX, RF gain control and adequate metering. The IC-737A partially overcame this by adding VOX. The IC-736 included an RF gain control, better metering and, of course, six metre coverage as well as a built in AC power supply. It also introduced a one Hz tuning rate and display. There was no provision to operate the transceiver from a 12 volt

DC supply so the IC-736 is a dedicated base station only. Enter the IC-738 with all of the operating features of the IC-736, less six metres and the AC power supply.

The IC-738 is 12 volt powered so it is suitable for mobile or portable operation. For home station use you will need an external 13.8 volt power supply such as the PS-15, PS-30 or the PS-55, all of which are available from your ICOM distributor.

### Features and Facilities

In order to save you referring to my two earlier reviews, I will run through the main features of the new IC-738. For a mobile transceiver it is fairly large. It is a bit difficult to relate this to ICOM's latest advertisements that claim "ICOM radios are getting sleeker and slimmer". It looks as if Duncan has lost a kilo or two but I am not so sure about the IC-738!

The overall dimensions are 111 mm high, 330 mm wide and 285 mm deep. Overall weight is 8.6 kg. One of the highlights of the series is the large LCD readout. Illuminated in bright orange with black numerals, the intensity can be adjusted by an

internal preset control. Following on from the earlier models, the "S" meter is rather dull. The transmitter covers all amateur bands from 160 to 10 metres while the receiver has full coverage from 30 kHz to 30 MHz. Operating modes for both transmit and receive are SSB, CW, AM and FM. The transceiver comes with three filters, a 2.1 kHz for SSB and CW, a 6 kHz for AM and a 12 kHz for FM.

Narrow CW filters are available as options. The one Hz tuning rate and readout introduced on the IC-736 is there in the IC-738. Front panel layout is unchanged from the IC-736 and the number and location of controls are the same as the original IC-737. However, the compression level control has been shifted to the rear panel to make way for the RF gain control and the "tune" button is now the meter switch. Meter functions are: "S" meter on receive and ALC, RF power output and SWR on transmit. These are selected sequentially with each push on the meter button, with the LCD indicating the mode selected. One important difference between the IC-738 and the IC-736 is that the final RF amplifier on the 738 is powered from the 13.8 volt line whereas the 736, with the benefit of an AC power supply, allows its final to run from a 40 volt line. However, as we shall see later, the intermodulation distortion performance of the IC-738 is very good none-the-less.

### On The Air

I found it virtually impossible to pick any differences between the 738 and the 736. Again, an ICOM HM-36 hand microphone was supplied and, for the tests, I also used an SM-6 desk microphone. Transmitted audio was again rated as thin and slightly harsh. The speech processor was effective in adding a degree of punch to the signal. A generous 100 watts was obtained on all bands and intermod distortion was found to be better than -30 dB, an excellent result for a 13.8 volt powered transceiver. Overall, the receiver performed very smoothly except for the rather muffled audio response. The AM performance, in particular, sounded very woolly.

There was almost no difference in audio quality between SSB reception of an AM signal and the actual AM mode. I measured -15 dB at 3 kHz on



ICOM IC-738.

the IC-736 and it sounded just as bad on the IC-738. My guess is that the receiver audio amplifier has a sharp cut off above about 2 kHz and this affects all modes. There might well be a simple modification to overcome the problem. No doubt time will tell.

All of the great operating features of the IC-736 are retained with such things as the double band stacking register, the memo pads for quick entry of temporary memories and, of course, the one hundred and one normal memories all of which are fully tunable. Also the front panel key pad allows direct frequency input.

### On Test

It soon became obvious that the overall performance of the IC-738 was identical to the IC-736 in almost all parameters except, of course, that the IC-738 does not operate on six metres. To save referring to the earlier IC-736 review, I will run through a few of the more important test results. Transmitter power output in the CW mode was in the range of 124 watts

on 160 metres to 107 watts on 10 metres. It is possible to reduce the power output down to about five watts with the "RF PWR" control. This control operates on all modes. Transmit intermodulation distortion was estimated to be just in excess of -30 dB as referred to normal SSB speech output which is very good for a 12 volt powered transceiver.

On the receive side, the sensitivity in SSB mode at 14.2 MHz was 0.14 µV for 10 dB SINAD. The "S" meter indicated S9 with an input of 20 µV measured with the "Preamp" switched in. Sensitivity and "S" meter indication was even across the bands. Once again I was not impressed with the quality of AM signals so I repeated the tests I carried out on the IC-736. The results were much the same. The -6 dB points were at 250 Hz and 2.2 kHz with the response down -16 dB at 100 Hz and 3 kHz.

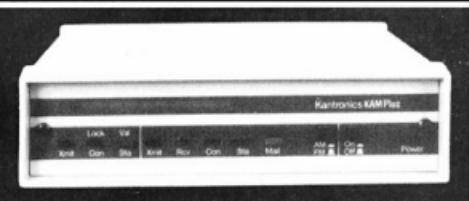
The notch filter produced a notch depth of -28 dB, however, I thought that the notch width was a bit too wide

at the top giving a rather hollow sound to the audio. Audio power output is excellent with more than the specified 2.6 watts being produced at less than 10% distortion and the product detector distortion still an amazing 0.3%. Stability tests came up with an even better result than I found in the IC-736, with total drift of less than 15 Hz over an extended operating period. Again I would very much like to try an IC-738 with the optional high stability master oscillator installed. Over all, an excellent result.

The IC-738 is one of the best performing transceivers on the market at the moment. Pity about the transmitted and received audio quality.

### IC-738 Instruction manual

The instruction manual for the IC-738 also doubles for the IC-736. Well, why not. After all, the operation is exactly the same in 95% of their functions. The format of the book is very much the same with excellent



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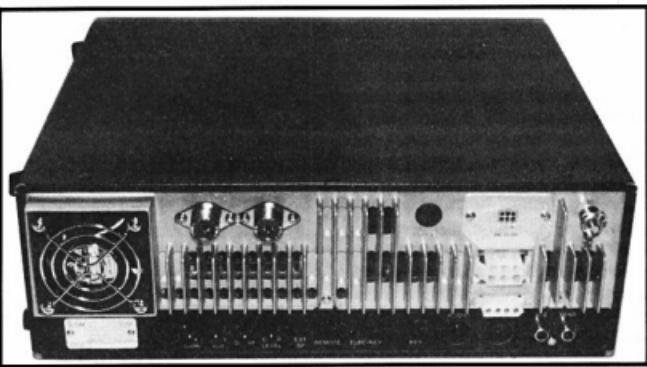
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Rear panel of the IC-728.

line drawings to describe operation. Photographs detail several adjustment points that could come in handy in the future. Again there is no technical description of how the IC-738 works. On the basis that the manual now covers two different models, I am going to drop my score rating one point to seven out of ten.

### IC-738 Conclusions

There is no doubt that ICOM have responded to a demand for increased operating facilities with the IC-738. However, I have to ask a few questions. Why weren't they included in the original IC-737, as I asked in my original review? So, having gone this

far, why not a bit further? The biggest surprise is that an inbuilt AC power supply is not offered as an option. There is certainly room for it, and one fits very well into the IC-736. My other wish is that the positions of the RF gain and the squelch controls should be changed over, with the RF gain concentric with the AF gain and the squelch positioned as the minor control. Then, with a meter position for measuring compression, the IC-738 (or will it be the IC-739?) would rival the top-of-the-line transceivers on the market at the moment.

The IC-738 is priced at \$2901.20 which is nearly \$300 up on the price of the original IC-737. Of course, the IC-738 replaces both the IC-737 and 737A and these are no longer available.

Thanks to Duncan Baxter for the loan of our review IC-738 transceiver. For further information on availability of the IC-738, give Duncan a ring at ICOM on (008) 338 915.

\*24 Sugarloaf Road, Beaconsfield Upper VIC 3808

ar

## WIA News

### Packet Radio Users and the Law

Since a telephone computer bulletin board user in West Australia copped a \$40,000 judgement in a defamation action earlier this year (see *WIA News*, May issue), there has been protracted debate among the radio amateur community about the liabilities of packet radio use.

Under the current radiocommunications regulations governing the amateur service, any packet radio station forwarding messages is responsible for their content. Add to this the situation under defamation law that any station operator transmitting or forwarding a message originating from another station having defamatory content is a "knowing publisher", even though their station automatically forwards messages. The originator and all forwarding stations are liable under defamation law.

The problem is, a practice has allegedly arisen in which packet operators use the callsigns of other stations to transmit messages which are possibly defamatory or otherwise in breach of the amateur regulations. Suggestions have been circulated that the "problem" could be readily circumvented by using software which provides for packet message "authentication" by users. Such authentication software employs encrypted character strings embedded in the packet message, but there has been concern that the use of this type of software may also transgress the amateur regulations.

A spokesman for the SMA has advised, in responses to individuals, that the existing and foreshadowed amateur regulations allow the use of such encrypted strings for authenticating packet messages. The SMA spokesman

has also indicated the Agency would be reluctant to legislate that authentication be mandatory, or to specify a particular system. Reduced regulation, wherever possible, is the aim.

To be on the safe side, packet BBS operators should store and view messages to confirm that the contents are not libellous or in breach of amateur regulations. Even with authentication, the SMA spokesman points out, Section 108(d) of the Radiocommunications Act 1992 places the onus on all licenses, including packet BBS operators, not to permit their stations to be used to affront, alarm or harass other people.

In the USA, the FCC places the onus on the originator and first PBBS station to keep the content of messages within the law. In Australia, it is every operator's responsibility.

## ■ History

# Darwin Revisited WICEN and Cyclone "Tracy" — Christmas 1974

Ted Gabriel VK4YG\* recalls the momentous events of 54 and 20 years ago.

This Christmas day marks the 20th anniversary of the devastation of Darwin by Cyclone "Tracy" and the massive relief effort to aid the stricken city and its citizens.

It was also the greatest challenge faced by WICEN and amateur radio operators. How this emergency was handled is fully described in the article "The Christmas of '74" in *Amateur Radio* of June 1985, Vol 53, No 6, page 18.

The WICEN National net for Darwin was activated by VK4YG and John Roberts VK4TL in Cairns when a request by Bob VK8RR, the Manager of OTC Darwin, for an urgent message to his headquarters in Sydney, that the OTC and VID, Darwin shipping radio, transmitter site had been wrecked.

This was the first official traffic which was handled by a WICEN operation that lasted for seven days and involved many amateurs nationwide and included the marathon effort by Slim Jones VK8JT at the Darwin Base Station.

My first acquaintance with Darwin was in May 1940 when, as a young RAAF pilot, I was posted to No 12 GP

Squadron located on the civil aerodrome at Parap.

In June 1940 the Anson flight was moved to the new RAAF base to form No 13 GR Squadron, flying Lockheed Hudsons.

No 13 was involved in action against the Japanese in the area north of Australia. It won many battle honours and was, along with No 2 Squadron, awarded the United States Presidential Unit Citation.

My next visits to Darwin were in the 1950s as a pilot with Qantas. The city had recovered from the wartime bombing raids, was growing steadily and shedding the image of a wild and isolated frontier style town.

Following cyclone "Tracy" Darwin was again rebuilt, this time to modern building standards and cyclone regulations, to become an attractive tropical city.

The years passed and in 1990 I returned to take part in the 50th Anniversary of the RAAF base and the honouring of No 13 Squadron as the "City of Darwin Squadron".

\*PO Box 245, Ravenshoe QLD 4872

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## ■ Antennas

# A Transportable Tiltover Tower

"Doc" Wescombe-Down VK5HP/VK4CMY describes the antenna mast that you might just be looking for.

This project

- cost less than \$50 to build
- suits CLUB and INDIVIDUAL use
- is transportable (when dismantled) and suits fixed base or field day application
- supports HF, VHF or UHF arrays
- may be guyed or unguyed
- assembles/disassembles in less than 30 minutes
- can be built by one person in one day
- can be handled and erected by one person
- suits temporary use including caravan parks

We may start with a 70 cm diameter x 12 mm thick steel baseplate to which 2 x 30 cm long x 50 mm steel tubes are mounted. These will sleeve into the two 6 metre heavy-wall cradle section steel pipes and locate them in place.

A recycled 200 litre (44 gallon) drum has the top removed and 2 x 50 mm holes drilled in the base (along

with other water drain holes around the drum base rim) so that it slides over the 30 cm steel tubes and then sits on the steel base plate. For more substantial operations, the 200 litre drum may be bolted to one, two or three additional drums which, when filled with ballast, increase both the base area and base mass and thus enhance all weather stability.

Once the drum is in place, the 6 metre cradle section is lowered into the drum and located on the two 30 cm pipe locators. Large pieces of local rubble, buckets of gravel, etc may then be used to fill the drum — this provides the base mass of stability whilst the base plate adds both mass and area to the base.

After ensuring the cradle section is vertical, the hinge is assembled and the 6 metre lattice mast section bolted in place, tilted over to the ground. A stepladder is needed for this assembly. Details of the hinge assembly are shown in Figure 1

(copied from "HINTS AND KINKS FOR THE RADIO AMATEUR ARRL 1974") but note that two U-bolts should appear on each 100 x 75 x 5mm flat plate whereas the original sketch shows two on one side and only one on the other.

The lattice mast section has a 90 cm concrete counter weight poured "in situ" using 3 ply or heavy cardboard taped to the mast for formwork. The formwork may be removed the following day and the concrete counter weight kept damp for a few days.

This counter weight offsets the weight of a large HF array and may be correspondingly smaller if only VHF or UHF arrays are to be used.

The lattice mast, together with rotator and mast pipe if used, is then pulled horizontal and rested on a stepladder while the antenna is installed. The whole hinged section is then pulled vertical by a single hand rope and the locking bolt installed. The completed assembly is shown in Figure 2.

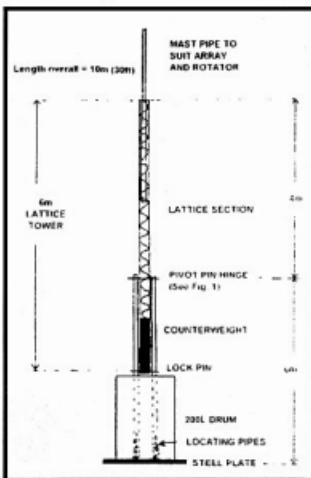


Figure 2 — Complete tower assembly.

More sophistication may be obtained by using a gin pole with boat winch, but it's not essential. Overall height is 10 metres (without masthead pipe) and I have used a 4 element 15 m/6 element 10 m quad on a 9 metre boom atop this unit quite successfully.

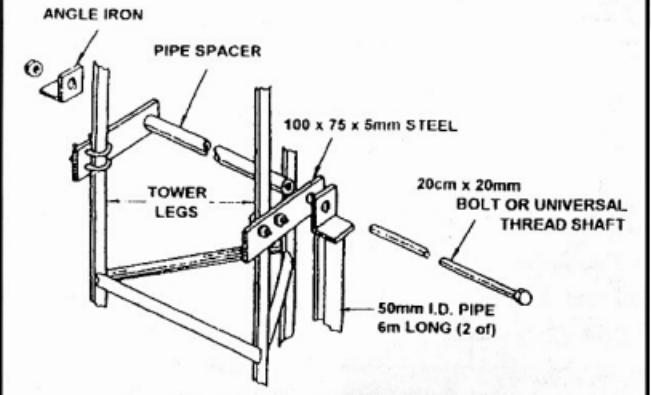


Figure 1 — Hinge bearing detail.

Some Council by-laws prohibit permanent antenna installations in excess of 10 m in height but, if such a transportable unit were built using a base support of 4 drums bolted together (Figure 3), stability without permanence could be achieved if the installation were to be a bit taller than 10 m.

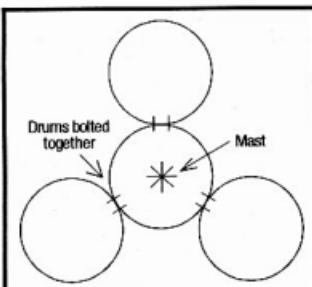


Figure 3 — Top view of tower assembly.

#### Parts List

1 x 200 litre (44 gallon) drum  
1 x bag of concrete mix  
1 x 70 cm diameter x 12 mm thick steel plate  
2 x 30 cm x 50 mm OD heavy steel pipes  
2 x 6 m x 50 mm ID steel pipes (2.5 mm wall)  
1 x 6 m x 15 cm triangular mast section  
(OR single pipe mast as an alternative)

Assorted pieces of strap iron etc for cradle section crossbracing (within 200 litre drum)

Hinge hardware (see Figure 1), paint to suit, welding rods, packing tape to hold formwork.

\* Cf. Post Office Dalveen Qld 4374

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#### QSP News

Did your November copy of *Amateur Radio* arrive late last month? Did you wonder why?

Well, it was delivered on time to the mailing house on the last Friday in the month, but they had a machine failure which took several days to fix.

However, it was worth waiting for, wasn't it?

## ■ Technical

# The CRADBIG Charger

*Reg Carter VK3CAZ\** says it's "Crude, Rude And Disgusting But It Goes!" and then tells how.

During the months either side of the midwinter solstice a friend, reliant on Solar Panels to charge 360 Ah of 12 volt batteries powering his home, finds his rig pulls the energy out faster than the solar cells can put it in.

Consequently there was a need for a good 20 to 30 A battery charger. There are plenty of petrol-driven 12 volt (nominal) generator sets on the market but being designed to run 12 volt appliances they are pretty useless at charging batteries. As soon as the battery voltage nears 13 volts or so the charging current drops off and it takes a lot of petrol to fully charge the battery. A car alternator as supplied is really no better since it, too, is designed to run the car's electrical systems with its charging of the vehicle battery a somewhat secondary feature. Once the battery reaches 13.8 volts or so it ceases to charge at any appreciable rate and so fails dismally as a charging system.

So we set out to make a battery charger with a good output, starting off with a small 3 1/2 horsepower petrol engine mounted on a steel frame. A second-hand alternator (Lucas in our case) was obtained, checked out for serviceability and

then stripped down. The stator windings and output diodes were left strictly alone but all the regulator side feeding the rotor, or excitation coil, was removed leaving just the two brush holders. One of these brush holders was connected to the frame of the alternator and the other brush connection brought out as an external connection. Once the alternator had been re-assembled it was mounted on the frame so that it could be driven by a "Vee" belt (in the correct direction as shown by the arrow stamped on it) at about 2 to 2 1/2 times engine speed, as determined by the size of the pulley fitted to the driving engine. Then the alternator output connection and the frame of the alternator (its negative output terminal connection) were connected to the batteries via an ammeter capable of reading 40 A. The new connection for the excitation coil was returned to the positive output terminal of the alternator via a 32 cp (approx 18 watt) automotive direction indicator globe and an on/off switch as shown in Fig 1.

Once the petrol engine had been started and had warmed up, we ran it up to a speed of 1400-1500 rpm.

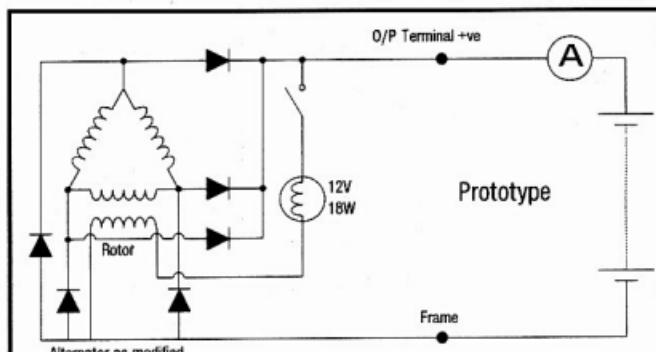
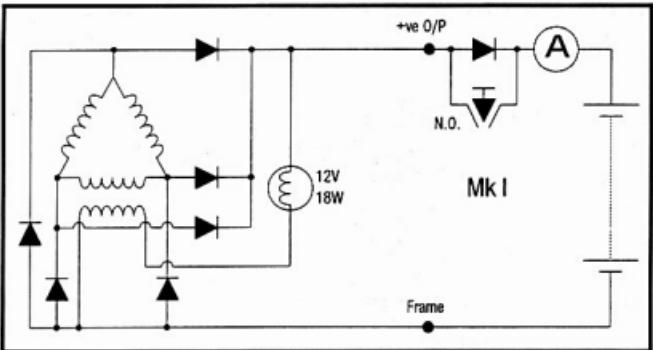


Fig 1.



**Fig 2.**

Then the switch was closed so that (by later measurement) a current of about 2.2 A flowed in the rotor. The alternator was delivering around 20 A to the battery and this could be increased to 25-30 A by increasing the engine speed. The series globe in the excitation circuit provided a measure of output stabilisation since it was not at full brilliance and so if the output voltage of the alternator rose so did the resistance of the globe and consequently the excitation was reduced. We had a virtually constant voltage charging system.

This first model delivered about 60 Ah per litre of petrol so at Ballarat prices it was about 0.82 c per Ah. I rather like the new unit of Ah/l so will use that!

This prototype did, however, possess two flaws, one minor and the other major. The minor flaw was that if the petrol engine stopped for any reason some of the hard-won charge flowed back from the battery through the excitation coil and was wasted in lighting the series globe, until the switch was opened. This flaw was overcome by fitting a 70 amp diode, mounted on a heatsink, in series with the output lead and fitting a momentary-contact, normally-open, push-button switch rated at about 5 A to bypass the diode. The switch in series with the globe was removed and the lamp wired permanently to the output terminal connection, see Fig 2.

### Mark I

Now, in operation, once the petrol engine was running correctly the

push-button was momentarily depressed allowing the battery to initially excite the alternator. Once released the alternator excited itself and delivered its output. If the engine stopped, the diode, being reverse-biased, isolated the battery from the charging system thus remedying the first flaw.

The major flaw was that the system was so simple that there was little to go wrong and if the globe, the only thing that could fail, went open-circuit the system was "fail-safe". That, of course, is no way for an amateur-built thing to behave, so it had to be made more sophisticated so as to increase the probability of failure. By the way, have you ever looked up the original and still true meaning of the word "sophisticated" especially when used in the perfume industry. I am glad I make no claims of being sophisticated!

Anyway, in an attempt to

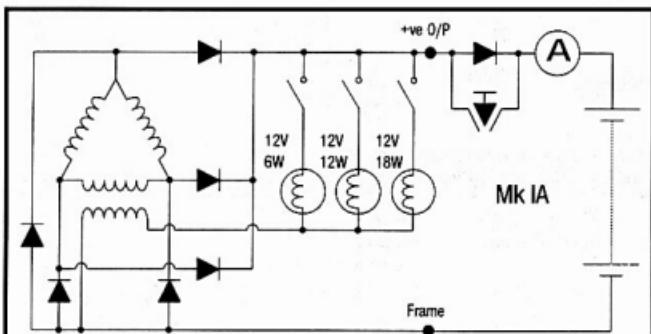
complicate the issue it was contemplated that we replace the single globe with three globes, of 6, 12 and 18 watts rating, each controlled by an individual on/off switch. This, it was felt, would permit the selection of six different charging rates as selected by single switches or combinations of switches. The Mark IA as shown in Fig 3, was stillborn as it was deemed not to be complex enough nor fallible enough!

It was finally decided that the only way to introduce enough fallibility into the system was to use semiconductors to control the excitation current. This, it was felt, would ensure sufficient failures to provide the maximum inconvenience when using the charger.

Thus emerged the Mark II controller as shown in Fig 4. This was built and proved disgustingly reliable and successful, giving outputs up to 40 A and being capable of so loading the engine as to stall it!

The semi-conductors were fitted with, or to, heatsinks; these being a "flag" for the BD139 and a Minifin section for the 2N3055. The whole unit was built into a metal box with the two large heatsinks for the 2N3055 and series diode being mounted on opposite ends.

Take your pick of excitation schemes but be warned that this is NOT a power supply, it is a battery charger! If you consult a GOOD book on the subject of lead-acid secondary cells, most of which you will find were written quite some years ago, it will point out that the terminal voltage of a lead-acid cell at "top of charge" is



**Fig 3.**

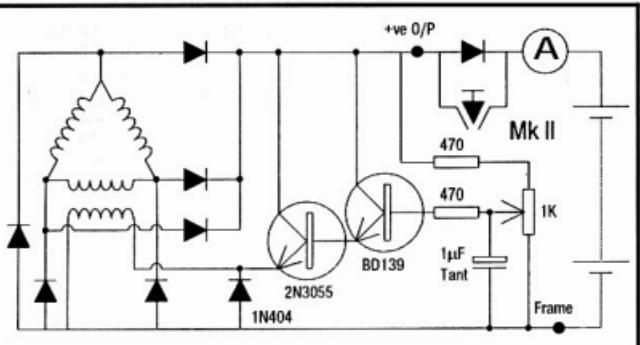


Fig 4.

between 2.5 and 2.8 volts per cell dependent on several factors including temperature, charge rate and acid density among others. That means that the terminal voltage of your battery when fully charged can be as high as 16.8 volts. If you allow for a little internal resistance such as is found in "the old battery used for field days" and have a charging current of 15-20 A then it may well exceed 17 volts. Should you be stupid enough to connect your precious rig

to a supply of that value it won't like it at all and you may let all the brown smoke out of the components so they don't work at all! So remember, if you build something like this, it is a BATTERY CHARGER.

Eric VK3FRO did all the hard work of making up the frame and mounting the bits plus turning my suggestions into hardware and any credit should really be his. Anyway the Mark II has delivered 30 A continuously for six hours without distress at a rate of about 75 Ah/l (I like that unit!).

Good luck and have a go choosing whichever Mark takes your fancy and will meet your needs. But remember, "what isn't there can't go wrong".

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## WIA News

### Family Membership

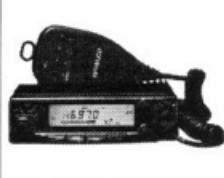
A proposal from the VK7 Division that a "family membership" grade be investigated, has been recommended to the Federal Council by Jim Forsyth VK7FJ, Federal Councillor for VK7. The proposal is to be investigated by the new Federal Secretary, with a view to reporting to Council as to costs and feasibility at the next quarterly meeting in February, next year.

The NZART has a family membership grade. Details of its operation was described to the Federal Council by NZART delegates who attended the WIA's Federal AGM in May.

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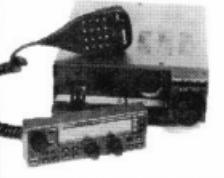
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## Digital

# A PLL Carrier Detector for the 7910 Packet Modem

Lou Destefano VK3AQZ\* further improves his packet modem.

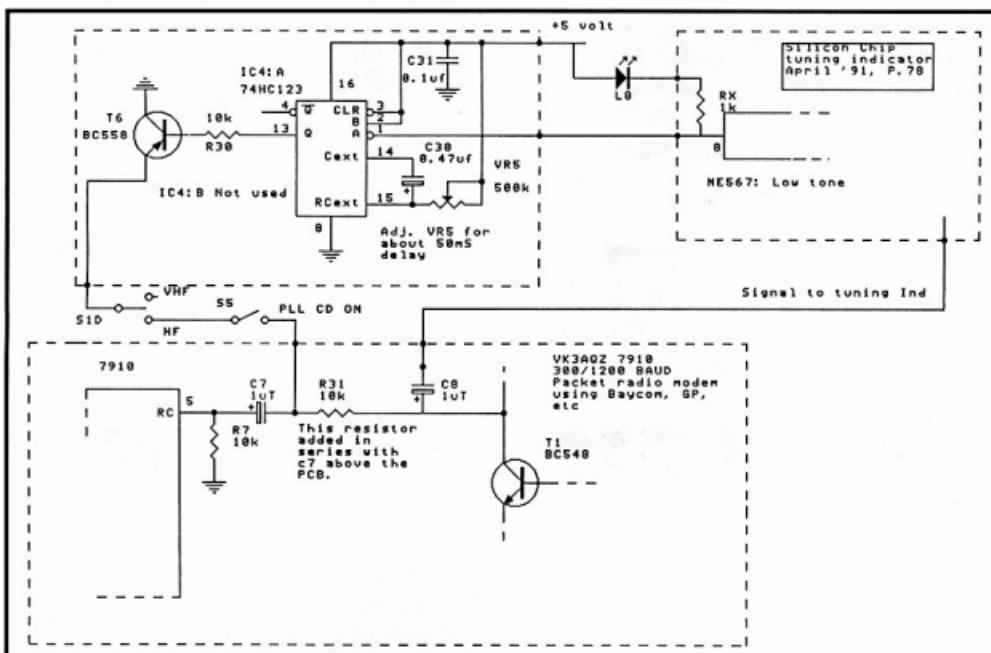
The 7910 300/1200 Baud packet radio modem uses the carrier detector function within the 7910 chip for determining channel activity. Some software uses the chip's carrier detected squelch to commence transmission. In addition to the presence or absence of data, Baycom also uses software bit count detection, and this can be selected by setting the Carrier parameter to 0 or 1. Because the 7910 was designed for telephone line use, the carrier detect circuit triggers with moderate levels of noise, and thus prevents the

software from commencing transmission, even though the channel is clear of packet signals. Software detection is an improvement, but still not satisfactory. This problem mainly affects HF packet. VHF packet normally uses FM, which uses a separate mute in the receiver, and thus does not present a problem.

The modem circuit I built incorporated a tuning indicator system published in Silicon Chip, which uses a pair of phase locked loop chips (NE567) as narrow band

tone detectors. It was noticed that the tuning indicator LEDs did not come on with noise as readily as the carrier detect LED on the 7910. Because the NE567 is a PLL device, a tone needs to be received before it locks up properly. Using this information, I built a simple interface between the tuning indicator and the 7910 which acts as an audio squelch into the 7910. The circuit consists of a re-triggerable monostable (74HC123) which is driven by the NE567 and turns a squelch transistor off in the presence of one of the packet tones.

The tuning indicator uses one PLL chip for the packet low tone and one for the packet high tone. It was found that it was only necessary to interface to one detector and a small delay used to span the time interval of the other tone. The delay was also necessary to stop the squelch transistor pulsing the input to the 7910 at the data rate and confusing the modem. After some experimentation, I adjusted the timing trimpot for around 50 to 100 msec. If this time is too long, your transmission delay will be extended, which will slow up the



data throughput. The 74HC123 consists of two monostables and it was intended to use one for each tone. However, this is not necessary and so the other one is left unused.

The output of the monostable is fed into a PNP transistor (T6) which is connected to the junction of the coupling capacitor feeding the input of the 7910 (pin 5), and a resistor going to the collector of the amplifier transistor, T1. Resistor R31 is added by removing the positive lead of the 1 µF Tantalum capacitor from the PCB, and placing the resistor between this flying capacitor lead, and the PCB hole. Make sure the resistor goes into the correct hole which takes it to the collector of T1 and effectively provides DC power to the squelch transistor. If you have a CRO, connect it to the junction of R31 and C7 and observe the unmuting action of T6 when the low tone LED lights up. Adjust VR5 so that there is no pulsing at this point with packet data, and a suitable delay exists after the tone drops off.

The monostable input is derived from pin 8 of the NE557 and this point goes low when the correct tone is received. It is a negative going pulse and so it is fed into the negative trigger input of the 74HC123. The Q output of the 74HC123 is used to drive the PNP squelch transistor. When the Q output is low, T6 is turned on and effectively shorts the incoming audio to ground. When the Q output goes high, the transistor turns off and the audio is allowed to enter the 7910. I could have tried to squelch the TTL side of the 7910 output, but I was concerned about the effect of pulsing the data line on and off. However, the extra delay available using that method would be beneficial. With the method used here, you can observe the carrier detect LED coming on and off, which is handy when setting the receive level. After the addition of this circuit, I find I can turn the audio level up considerably higher before noise starts to affect the packet transmission.

The muting transistor connects to

the main PCB via an on/off switch and a fourth pole of the VHF/HF selector switch. This disables the muting function on VHF as it is not needed. The other switch was added so that I could observe the effectiveness of the mute, and also disable it if I felt it affected the receive in any way. In practice I now leave it on all the time. As there are only a few parts I built the unit on a small IC test pad PCB board that you can buy from Tandy and other electronics hobby suppliers. A piece of matrix board would also suit.

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## ■ Technical

# Technical Abstracts

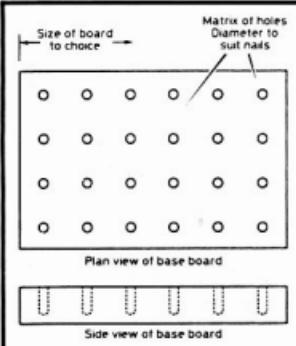
Gil Sones VK3AUI

### Peg Vice for Printed Circuit Boards

Holding and manoeuvring components and printed circuit boards together with other tools is difficult. A holder or vice is useful but they can be expensive if used infrequently. A simple and cheap device was described in the October 1994 issue of *Radio Communications* in "Novice Notebook" by Ian Keyser G3ROO. The idea comes originally from John G0FZW and uses nails, clothes pegs, and a piece of board to produce a versatile vice for holding a printed circuit board (PCB) while you work on it.

Parts count for the device is very small being only four nails, four clothes pegs and a scrap of wood. The pegs should preferably be made of wood with a spring closer.

The Peg Vice is shown in Fig 1. A suitable piece of board is selected as the base for the device. A scrap of particle board or the offcut from a plank would be suitable. A matrix of holes is drilled in the base to suit the size of the nails being used. The holes should be slightly larger than the nails and should be drilled about 10 mm deep.

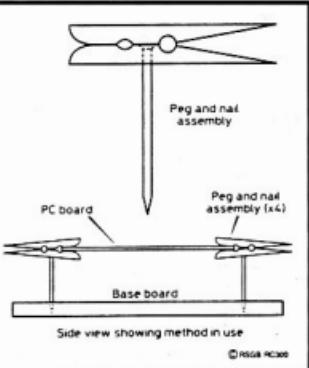


The clothes pegs should be wooden, for preference, but plastic could be used. Drill a hole in each peg to suit the nails being used. The nails should have their heads removed. Insert the blunt head end of the nails into the holes in the pegs. You may be able to just push the nails tightly into the holes in the pegs. A spot of glue may be required.

*This simple device will free your hands while working on a printed circuit board.*

To use the vice the pegs are clipped to the edges of the PCB and the nails slipped into suitable holes in the base. The PCB is then conveniently supported whilst inserting components. To solder the parts place a piece of cardboard over the PCB and invert the board and re-clip the pegs to hold the PCB whilst soldering and trimming leads.

This simple device will free your hands while working on a printed circuit board. The cost is very small and the device can be quickly made to suit the job on hand.

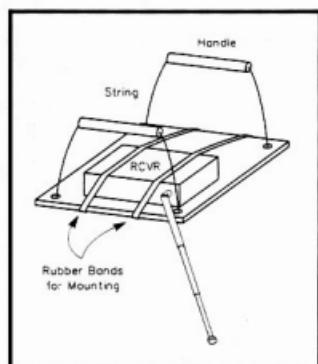


### Simple HF Fox Hunt Equipment

A simple technique to use a small portable radio as an HF direction finder was published in the August issue of *QST*. The authors were O G Villard Jr W6QYT, G H Hagn and J M Lomasney WA6NIL from SRI International.

The system uses a small portable radio, such as a SONY ICF 7600, held on a metal plate. An enhancement to reduce user body effects is the use of a simple Faraday cage made from a mailing tube and wire.

Basically the radio is mounted on a square conductive plate with the whip antenna extended along the diagonal of the square plate (see Fig 2). The antenna should always be in the plane of the plate. Fig 3 shows how the radio's whip is pointed end on with respect to an incoming radio wave. The wave has parallel fronts and so the whip is aligned so as to be perpendicular to the electric field. No RF current is induced in the whip except as a result of field distortion caused by the radio itself. If the radiated energy is electrically symmetrical with respect to the whip, however, the antenna will still null the signal.



**Fig 2 — Receiver Mounting on conductive plate. The whip should lie along the diagonal and be in the plane of the plate. Rubber bands hold the receiver in place.**

By mounting the radio on a conductive plate as shown in Fig 2 the reflected energy is symmetrical. In the null direction neither the incident wave nor the backward

**Fig 1 — Handy Peg Vice designed by G0FZW.**

directed symmetrical receiver scatter induce signal energy into the whip and the radio. The null direction is the diagonal of the plate extended in the direction of the whip. The result is a clean null if there are no additional signal sources present.

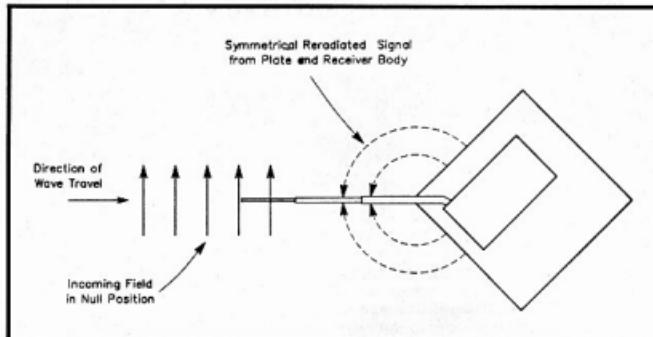
Small portable receivers are thin enough to mount face up on the metal plate. The radio is grounded to the plate and is then effectively part of the plate. The plate could be a sheet of printed circuit laminate. The plate plus receiver as shown in Fig 2 and Fig 3 are equivalent electro-magnetically to the plate alone. A good null is obtained when the incident wave is aligned with the receiver whip. The wave re-radiated from the receiver also has a null in that direction. The whip must lie along an extension of a diagonal of the plate and must be in the same plane as the plate.

The length of the whip is not critical. A long whip will give a bigger signal but may be awkward. If the whip is too short the reduced sensitivity will be accompanied by a poorer bearing accuracy. The plate can be a sheet of metal or a piece of printed circuit board laminate or even a card covered in aluminium cooking foil. The plate should be somewhat larger than the radio so as to accommodate the shape of the radio and the asymmetric whip mounting on the radio.

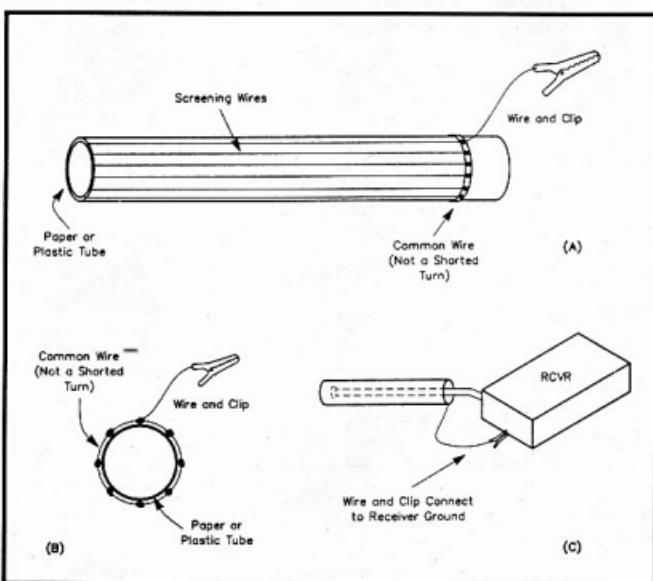
The whole setup is suspended from non-metallic strings and held clear of your body whilst rotating it to find the null. Elastic bands should be used to secure the radio to the plate. This will help maintain the radio position fixed with respect to the plate and help you to avoid dropping it. The null will be along the line of the whip and the diagonal of the plate.

To reduce sensitivity and make a null more apparent a partial Faraday screen can be used. This is placed over the whip and it will also help with re-radiation effects from nearby objects such as your body. The screen can be made simply and cheaply from a plastic or cardboard tube by taping some wires to it. The construction is shown in Fig 4. A suitable tube would be a mailing tube or an offcut of plastic conduit.

Body absorption can be used also



**Fig 3 — Field lines of the Incoming wave are perpendicular to the whip and induce no voltage in it. The receiver mounted on the conductive plate is symmetrical with respect to the whip. Parts of the end-on Incoming signal wave are uniformly scattered and don't upset the antenna null by inducing voltage into the whip.**



**Fig 4 — Faraday shield over the whip reduces signal pickup and makes directional nulls more apparent. (A) is a side view. (B) is an end view. (C) shows the Faraday shield in place. Use tape to hold the wires in place.**

as a check on the direction. Hold the radio with the whip in the Faraday screen vertically against your body and turn around. The signal will suffer greatest absorption to your rear where body absorption is greatest. This can be used to check the null obtained.

This seems to be a simple

technique but it could be used to good effect backing up other more sophisticated equipment. It would also be useful in tracking down noise sources with simple equipment. You should be ready to explain to interested onlookers though as the strange antics will not go unnoticed!

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HB-35C

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TE-44 4-ele beam on 14-21-28MHz, 1-ele on 7MHz ..... \$870

TE-44



TE-56

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TE-26 dual rotatable dipole ..... \$380

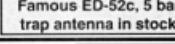
TE-46 3-ele beam on 14-21-28MHz, 1-ele on 10-18-25MHz ..... \$750

TE-56 3-ele beam on 14-21-28MHz, 2-ele on 10-18-25MHz ..... \$950

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TE-56

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# Roof Top Run — January '94

Jack Bramham VK3WWW\* found out about the Roof Top run in the best way short of actually running in the event. His account was previously published in the EMDRC Bulletin.

I had been looking forward to this event for quite some time so, with eldest daughter Erica in tow, we left Melbourne on New Year's Eve headed for Falls Creek. Upon arriving there we decided to move out further to escape the New Year's Eve revellers. We found a few family groups at Langford's Gap West caravan park who had decided that 2130 was close enough to celebrate the new year.

## Saturday, 1 January. Temperature 2.5°C.

The weather was looking fine for our 8 km hike from Watchbed Creek to Roper's Hut. We were to join up with two other hikers but by 1230 they had not arrived so we pressed on. This is where the hard work started, with Erica complaining that her pack was rubbing. I relieved her of it and strapped it to the top of mine. With this problem out of the way we continued on and after many rests finally arrived at Roper's Hut around 1600. We were both totally exhausted and it took me about thirty minutes to recover sufficiently for the job of setting up antennas.

Bob VK3UI had told me that this location was bad for transmitting so I had brought in a 4 element Yagi, a 6 m mast, a small 2 m linear, two 6.5 Ah gel cells, a 1.2 Ah gel cell, a dual band HT and a 2 m HT plus plenty of patch leads, power cables, tools, etc. I was determined to open up either VK3RNE or VK3RHO. While setting up the mast I had left my 2 m HT monitoring VK3RNE, but not expecting to hear anything, I was surprised to hear Bob come on. Did this mean that I didn't need all the extra equipment? A quick call to Bob confirmed that I was readable into the repeater on 5 watts using a rubber ducky antenna. Didn't Murphy say

something like "If you don't have it you will be sure to need it". I proved that the reverse is also true "if you take it you won't need it".

## Sunday, 2 January

At 0545 the VK3AWI operator stirred us into action with a wake up call. Weather conditions were not good. With gale force winds on the summit of Bogong and also Mt Hotham the runners were in for a tough time. Light rain had been falling since about 0430.

The race started at 0623 but the first runner was not due to reach our checkpoint until about 0915 so there was plenty of time to have breakfast and prepare ourselves. Our checkpoint was manned by myself, my daughter and two ladies who had an interest in the race but also wanted to experience some of Victoria's beautiful high country.

We could hardly believe that the first runner to reach us had just run from Mountain Creek at the base of Mt Bogong, up the staircase to the summit, along to Maddison's Hut, down across the Big River and up Duane Spur following the Alpine walking track to our checkpoint. He looked as though he had just started 200 metres down the track! Most of the runners were in a similar state but this fellow continued in this vein throughout the entire event. Even after he had run the 60 km from the start to the finish at the summit of Mt Hotham he still had enough energy to run from the summit down to where his car was parked, get a pullover and then run back up to the top again in time to watch the next competitor arrive!

At 1330 the last bunch of runners arrived at our check point. After strapping up one slightly sprained ankle and feeding them with fruit,

lollies and chocolate we filled their water bottles and they were on their way again. Our job was over and we could pack up our gear for the walk out. The return trek was a bit easier for me as I had by this time managed to offload about 14 kg of gear onto the back of a friendly hiker. Back at the car we stowed everything away and headed for the "Cosy Kangaroo" in Bright where it was good to eat some real food and chat to some of the other operators and also a few of the runners.

## Monday, 3 January 0045

Back home again after a very enjoyable experience but, for the life of me, I can't work out who is crazier, the runners or us! Later in the afternoon before putting everything away I weighed my pack as it would have been when we started out and it came to 43 kg excluding the water bottle and food. Be assured, next year the contents will be severely pruned. On second thoughts perhaps I should just enter the race instead. Hi! Hi! Thanks to Bob and the boys for a very well organised event.

\*46 Nurendl Road, Vermont VIC 3133

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## QSP News

### Canadian Radio Amateur Elected to Key ITU Post

At the ITU Plenipotentiary Conference in Kyoto, Japan on 30 September, the International Telecommunication Union (ITU) elected Canadian radio amateur Robert W Jones VE3CTM to replace retiring Richard C Kirby WOLCT as Director of its Radiocommunication Bureau.

VE3CTM is currently the Director General of the Radio Regulatory Branch, under Industry and Science Canada, which regulates amateur and other radio service. His work with the ITU began in 1975 in preparation for the 1977 and 1979 World Administrative Radio Conferences (WARCs). He attributes his professional interest in radiocommunications to having become a licensed radio amateur as a teenager in 1959.

News item supplied by David Wardlaw VK3ADW

# ■ Digital — Humorous Packet Explained for the Beginner

Chris Davis VK1DO\* originally wrote this humorous look at packet radio for the ACT Divisional broadcast.

Here in the ACT, the packet group have done their usual excellent job presenting a back to basics evening. You might have missed it? However, it's not too late. Now you can absorb the wonderful novelties and unique qualities of the renowned world of packet. Here are a few valuable tips.

This specially prepared article is written by our skilled correspondent whose background includes diverse keyboard experience, and an innate knowledge of matters packet. What this writer doesn't know about packet is anyone's guess.

So then, back to basics. Some readers will be baffled by the terminology used in many technical articles. Don't worry. Just read on steadily and the jargon and terms will be broken down word by word, term by term.

First there is the term Packet. Some misguided types have tried to propagate some nonsense about data communications and the way in which the mode sends data in groups called packets. This is incorrect. The term PACKET stands for **P**rotocol **A**rranging **C**ommon **K**nowledge **E**xcluding **T**ruth.

The term KISS stands for **K**eep **I**nterfering **S**everal **S**tations simultaneously.

Some operators who have experimented with the mode TCP/IP somehow manage to delude themselves that it is some sort of fast reliable file transfer mode. A routine examination of the band during its operation will reveal that TCP/IP stands for **T**ransmit **C**ontinuous **P**acket **I**nterference **P**rogressively.

Having covered some of the terms relating to protocols and modes, perhaps I should cover some of the terms you are likely to encounter when you have actually connected to

someone or something. Firstly there is BULLETIN. In day to day life this is a well respected journal. In packet it means something quite unrelated. BULLETIN stands for **B**asically **U**seless **L**isting **L**acking **E**ntertainment **T**aste **I**nteresting **N**obody.

DIGIPEATING is another misunderstood term bandied about by the nervous packet gurus who try and disguise what they are actually up to. Some creative types have claimed that DIGIPEATING relates to the extension of one's range by using another person's station.

DIGIPEATING actually stands for **D**on't **I**nstall **G**ood **I**sopols **P**urposely **E**very **A**ntenna **T**hat **I**nfiltrates **N**owhere **G**oes.

So what about NODES? NODES stands for **N**obody **O**n **D**eck **E**xcept **S**ysop. Sysop is another one. SYSOP stands for **S**end **Y**our **S**ignals **O**n **P**hone.

Then there is NETROM of course. A very useful cheery abbreviation. NETROM stands for **N**othing **E**lse **T**o **R**eport **O**ld **M**an.

Don't forget RETRY. RETRY stands for **R**eally **E**xpecting **T**o **R**espond **Y**esterday.

Another popular term is LINKSTATE. LINKSTATE stands for **L**ast **I**tem **N**ot **K**nown **S**end **T**o **A**nywhere **T**race **E**xcluded.

BBS stands for **B**and **B**usy **S**till.

And last but not least there is BYE. Once you type this on your terminal, BYE describes what is happening on the band while you are away. **B**urning **Y**our **E**ars.

I hope you feel enlightened! So, NETROM for now.

\*123 Hawkesbury Cres Farrer ACT 2607

ar

## WIA News

### New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of October 1994

L20980	MS H GODSALL	VK3ZJB	MR J A BLANCH
L20981	MR H GUTTE	VK4APK	MR P W KIECK
L20982	MR D E ROBINSON	VK4CPG	MR C P GERHARDT
L20984	MR H J ROWLAND	VK4CXB	MR G E HAYWARD
L30902	MR W CHRISTIE	VK4DZB	MR G O BRAND
L50325	MR D P GLYNN-ROE	VK4EJ	MR B T MCIVOR
L50326	MR J B WHITEFORD	VK4IF	BRISBANE VHF GROUP
L50329	DR C J TYSON	VK4SKL	MR A M MCCASKILL
VK1ARA	MR A R A DAISUKE	VK5AFA	MR D J RAYNER
VK2CAP	MR H PREHN	VK5AGT	MR W C FRYER
VK2IBF	MR A KENZIAN	VK5AJK	MR J J KLEINRAHM
VK2MOM	MR B SHIPTON	VK5JI	MR V J M BOSHER
VK2MON	MR A TURVEY	VK5KTZ	MR M J A WHITING
VK2OC	MR K SHARPE	VK5LTD	MR C LARWOOD
VK2TDT	MR D J TAYLOR	VK5NFJ	MR J F T
VK2TFT	MR E M STRINGER	VK5NWH	NIEUWENHUIZEN
VK3FCA	MR D HUF	VK5PBF	MR W R HOLMAN
VK3JXJ	MR I MANSON	VK5RC	MR R SCHESTAVIN
VK3MWV	MS M WILLIAMSON	VK5SE	MR K P THOMPSON
		VK5ZEA	MR M CAREY
		VK5ZIK	MR R W DUNCAN
		VK5ZJI	MR S C ADKINS
		VK7LS	MR L A COOPER
		VK7MAJ	MR A J TABART

## ■ Operating

# Forever Courteous

Bob Hawksley VK2GRY\* has a word or two about the old-world niceties of CW operating.

In this troubled world there's a group of individuals embracing every race and creed but who are distinguished from the rest of mankind by being courteous to a fault. Dating from the moment the trade of telegraphist came into being, today the group consists largely of ham operators whose numbers now reach into the millions.

Yet ham operators are not noted for gregariousness. Rather, they prefer to spend much of their time alone surrounded by their apparatus. Like star to faint star they call to each other across the sky and since they know nothing of rank their conversations bear witness to their love for one another.

Never in my years of CW operating have I ever copied a harsh or cross word. On phone, regrettably, I've heard the occasional lapse but on CW never. Within that pristine and disciplined medium the chit-chat is replete with the milk of human kindness and an enormous reluctance to say goodbye. Whereas at the start of a contact this characteristic may not be apparent it soon becomes so, as one follows it through. Let me give a typical example, fictitious, of course, lest anyone thinks I'm getting at them!

I hear a CQ. Wondisi. Don't often hear anybody from that region. I reply. And Wondisi replies. Good. Another bit of rare DX for the log. Wondisi is brief and to the point, nothing lavish: TKS FER CALL = UR RST 579 = QTH UMDALA = NAME TONI = HW?

My reply is in a similar vein: 589, QTH SYDNEY NAME BOB. Toni replies: FB FB SOLID DR BOB OM. Dear Bob Old Man? A touch familiar to stern Australian ears but fairly common from some parts of the world. The French sometimes say Dear Bob Old Boy but I suspect it is

to give themselves moments of the utmost hilarity. Like Australians taking off the Poms. It is hilarious. Toni continues: RIG ERE 1 KW ES 3-EL BEAM = WX FINE 32C = HW DR BOB OM?

I trot through the same agenda rig, ant, and wx (I baulk at saying DR TONI OM) and then I play the QSL card ploy which is a polite way of saying I can't think of anything else to say. Back comes Toni: R R DR BOB OM = SURE QSL FB FB = HW UR FAMILY?

Ah! For some peoples talk of family is *de rigueur*. In parts of Asia it is rare to get down to the nitty gritty without a full and frank disclosure of family. It provides an opportunity for parents to bemoan the trials and tribulations of bringing up their children or to bask in the reflected glory of their achievements. Toni doubtless has been fretting to get to the topic because not to do so would be, for him, the height of discourtesy. So I rattle back appropriate details including grandchildren and Toni replies: FB FB DR BOB OM = HVE 5 WIFES 5 WIFES 10 BOYS 10 BOYS 8 GIRLS 8 GIRLS = U CUM UMDALA ES MKE QSO DR BOB OM = HW?

I reply with proper praise and avoid the more earthy response of FB SOLID OM HI and then say that since I am an OT I must QRT soon so that I can go to bed/dinner/out, whichever excuse seems appropriate, and I

conclude with 73s to TONI and his family and I hope to see him again and good luck and good DX and sure I'll QSL and even as I do so I realise that it would be unthinkable for me to say anything less because not to do so would be terribly rude...

For good measure I even add VA though VA no longer seems to mean what it used to mean: *I am ceasing transmitting*. Today it's more like: *He seems to be more or less at the end of our chat but if you want to carry on then go for your life because I've got all night*.

Toni is well versed and doesn't miss a beat. OK OK BOB DR OM ES VY GLD MEET U ES SURE U CUM UMDALA ES QSO WID FAMILY ES WIFES ES NW 73 73 ES SURE QSL ES CUAGN GD DX DR BOB OM GN GB E E.

To which I make a suitable reply but stop short of reciprocating the invitation because accommodation is limited and I can scarcely remember the name of my own family let alone one with 18 children and 5 wifes. So I sign gently off and VA for the second time.

Unabashed Toni chimes back: FB BOB DR OM ES TKS FER FB QSO ES WEN U CUM UMDALA FB WELCOME 73 ES CUAGN ES GD DX GN GB AR E E. To which I reply E E and Toni EE's and then, without batting an eyelid he bursts into full-flighted CQ song and he's away again.

I glance at the clock and realise I've been nattering for 32 minutes. I enter the log and then quietly creep along the band hoping to have one of those quick, simple and unencumbered contacts where RST, name and QTH are exchanged and that's the lot. Courtesy is lively but it does take time!

\*21 Wallumatta Rd Newport NSW 2106

**Repeaters — additions, deletions, alterations. Have you advised the WIA Of changes needed to the Repeater List?**

## ■ Technical

# Another Tip for Using the Noise Bridge

Lloyd Butler VK5BR\* describes a method of achieving higher resistance resolution with the usual type of noise bridge.

### Bridge Configuration

The elements of the RF bridge are a signal source, a balancing network and a signal detector. The usual form of bridge utilises a signal source which is set to frequency of measurement. This form of bridge operates with an untuned detector which, in effect, is a broadband circuit (refer Fig 1).

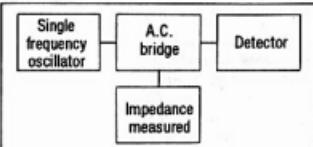


Figure 1 — Conventional form of RF bridge.

The noise bridge, used in amateur radio to measure the impedance components of antenna circuits, reverses the arrangement. The signal source is broadband or untuned and the frequency of measurement is set by a tuned detector, normally the radio shack receiver (refer Fig 2). This simplifies the equipment as the signal source is provided by a simple noise generating circuit and a built in detector is not required.

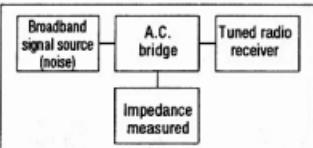


Figure 2 — Noise bridge.

### Use of Single Frequency Source

In general the noise bridge balances with a sharp null to give defined readings of resistance and

reactance on the respective dials. However, I have found that for certain combinations of the two components, the resistance null can be very broad making it difficult to decide on the precise value of resistance component. I have noticed this effect, in particular, when the measurement unknown has dominant inductive reactance and the resistance component is small.

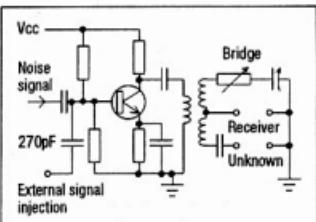


Figure 3 — Modification to noise bridge for external signal.

The resistance balance resolution can be sharpened up by substituting a single frequency signal source for the noise signal (in effect, reverting to the configuration of Figure 1). In my own bridge, I have fitted an external terminal pin connected via a capacitor into the base of the last amplifier transistor which couples the noise signal into the bridge network (refer Fig 3). Connecting my test bench signal generator into the terminal feeds its signal into the bridge network. The signal level from the generator is set high enough to override the noise source. For a receiver operated in the SSB or CW mode, an unmodulated signal is used to produce a beat note at the receiver audio output. The bridge is adjusted for a null in that output or a minimum reading of the S meter (if fitted). If the signal generator has amplitude modulation of tone, this can also be

used with the receiver set for AM mode.

I have not attempted to examine too deeply the reasons for the improved resolution but I suspect it is related to the significant receiver bandwidth. Receivers used for AM and SSB have a bandwidth of at least several kilohertz. Basically, the noise bridge network is a capacitance balancing circuit not critically affected by frequency when measuring fixed capacitance. However, when inductance is measured, the inductive reactance is subtracted from an internal capacitive reactance and the resultant capacitive component is frequency dependent. Furthermore, if the measured impedance is an antenna system, its components will be frequency dependent regardless of whether it looks capacitive or inductive. Considering these factors, one can well imagine the bridge having better resolution when operating at a single frequency than when operating with a signal spread over several kilohertz as defined by the receiver bandwidth.

For a receiver equipped with a narrow band crystal filter, one might consider switching in the filter as an alternative means to restrict the bandwidth and hence improve resolution of the bridge measurement. I haven't had a suitable receiver to experiment with this but I can anticipate one possible problem. Signal power detected in the receiver from the noise source is directly proportional to the receiver bandwidth and the narrowed bandwidth might reduce the noise source level too much for fine adjustment near the balance point of the bridge. This could defeat the initial objective in improving resolution. There is no such problem in using the single frequency signal source as signal power of the single frequency is not affected by bandwidth.

This simple modification, to allow external signal injection, is well worth while. I have made use of it many times when the adjustment null, using the noise source, was not well defined. The single frequency source often sharpens up resolution of the null very nicely.

\*18 Ottawa Avenue Panorama SA 5401

# ALARA

Sally Grattidge VK4SHE, ALARA Publicity Officer

First, a reminder to all those YLs who have been asked to tell their stories for the history being compiled by Federal Historian, John Edmonds. Please do not leave this in the "too hard" basket for too long. You don't have to create a literary masterpiece, just a short friendly letter telling something of what it was like being a woman in amateur radio in the early days.

Only three replies from VK4 so far (results in the other states unknown), so come on ladies, do it now, before you are up to your ears in Christmas cards.

It is nice to hear two new calls on the Monday night net. Welcome to Elaine VK4MEM, secretary of Gympie ARC and zucchini grower, and Diane VK4MFP from Logan City in the Brisbane area.

Summer is here with the usual increase in noise on 80 metres, so just a reminder that there are two Queensland nets for YLs in that state who have difficulty hearing the Southerners on Monday nights. The VK4 YL net originates in Townsville on Friday nights at 0930 UTC, somewhere near 3575 kHz, and the DRL (District Radio Ladies) comes from Rockhampton every second Thursday at 1100 UTC, also near 3575 kHz.

Christine VK5CTY visited her family in Melbourne recently, but also met with some other ladies. She spent a day with Bron VK3DVF and Gwen VK3DYL discussing ALARA matters, as well as enjoying their company.

Christine and her OM Geoff VK5TY had afternoon tea with Valda VK3DVT and Marlene VK3EQO (ex VK5OO), and then called in on Mary VK5AMD on their way through Bordertown. At Murray Bridge they shared an unexpected meal with Meg VK5AOV and her OM David VK5OV, before completing their trip in time to join in the ALARA Monday night net.

Margaret VK4AOE and OM Ervon are trying to grow Bully Beans (they sound a bit mean, but apparently sheep like them). The precious irrigation water disappears down huge cracks in the parched ground, and Margaret wonders if someone on the other side of the world is getting wet!

## JOTA

Sally VK4SHE and Bob VK4AAH manned one of seven JOTA stations in the Townsville area with about fifty Brownies, Guides, Cubs and Scouts at the Wulguru Scout Den. Bob picked up some DX on 15 metres, and it was discovered that you can't work 14 MHz with Packet in the next room. Propagation to the Sydney area was especially good on 14 MHz.

Most of the participants were Cubs and Brownies and, as it is quite exhausting concentrating on every word so that you can pounce every time someone says "I don't know what to say", the operators were happy to close down at ten o'clock and go to bed.

There were some amusing moments, like when an entire group in New South Wales sang "Happy Birthday" for one of the Cubs. In an effort to get away from one word over SHE whispered to one young operator "Ask them what activities they are doing". This produced a good North Queensland "What are yous doing?" and the answer "Talking to you on the radio."

VK4WIC was the callsign used by Neil VK4NF and Margaret VK4AOE during the JOTA operations with Dalby Yumborra Cubs, Brownies and Joey's, as well as the Dalby Guides. They commenced about 0400z using 40 m, 80 m and 2 m. Packet was also running but, unfortunately, there did not seem to be anyone operating that mode. QRN was evident during the afternoon which spoiled otherwise good signals, but they managed to enjoy contacts with VK4s and VK2s as well as ZL2AS.

Some of the young people handled their contacts like veterans. Joey's experiencing their first JOTA were all willing to take the mike, though tiny voices did not transmit very well and the little

fellow who nodded in reply to a query was not heard till he was persuaded to say "yes" instead of the nod.

Julie VK4JB operated on the Saturday for Bundaberg West Cubs and had visiting groups. She had eighteen boys and three girls. On Sunday she went to help with the main group. Elaine VK4MEM was part of JOTA in Gympie and operated mainly on 2 m.

District Radio Ladies participated in JOTA in the Rockhampton area with Guides and Brownies. Robyn VK4RL, Rob VK4SEA, Mary VK4PZ and Gordon VK4GM set up and operated until 11.45 pm on Saturday (Robyn turns into a pumpkin at midnight — at least that's what she told the kids, anyway!). Lorna and Ted VK4QI joined in for a few hours. Packet was flavour of the day — they could not keep the kids off the keyboard. No problems getting anyone to talk and contacts were enjoyed on HF and 2 m. The Guides were examined for their Radio badges and all passed.

Pat VK3OZ did not work JOTA this year, but received a call on 2 m during the evening from a local JOTA station who had a Scout Leader looking for a CW contact. They were able to have a QSO on 80 m, transferring to 15 m when 80 was found to be too noisy at the JOTA QTH. The QSO was enjoyed by Pat and the Leader, who was not an Amateur and knew very little about Amateur procedure. This was Pat's first CW JOTA contact in three years involvement.

I am now the ALARA Publicity officer, so please send your news items to me C/o PO Woodstock, QLD 4816. Because of the distance, please try to send copy two weeks before the deadline printed on page one in *Amateur Radio*. Later copy will be accepted and superhuman efforts made to get it in, but no guarantees.

By the time you read this it will be December, so Happy Christmas everyone, and all the best in 1995.

\*C/o PO Woodstock, QLD 4816

ar



# AMSAT Australia

Bill Magnusson VK3JT\*

## National co-ordinator

Graham Ratcliff VK5AGR

Packet: VK5AGR@VK5WI

## AMSAT Australia net:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7.064 MHz. (usually during summer).

Secondary 3.685 MHz. (usually during winter).

Frequencies +/- 5 kHz for QRM.

## AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia

GPO Box 2141

Adelaide SA 5001

## Sunday Night Net

Please note that for the remainder of the summer daylight saving period the Sunday night net will be conducted at 0900 UTC with early check-ins at approximately 0845 UTC. The frequency for this period will be 7.068 MHz +/- QRM.

## AO-21 Falls

On Monday 17 October DB2OS reported what looks like the demise of OSCAR 21. AO-21 was an amateur payload on board a large Russian satellite

called INFORMATOR-1. It is unclear at the time of writing whether the fault lies in the AO-21 package or in the larger system. The INFORMATOR-1 satellite had come to the end of its mission and attitude and thermal control had been suspended by the control station about a month ago. The amateur package had, however, been left switched on. DB2OS is investigating the position but it appears unlikely that we will hear AO-21 again.

This amateur radio package had become very popular among those equipped with only the most modest of gear. The down link signal was always very strong and at times stations using only a vertical antenna could be heard working through the FM repeater. Recently AO-21 had added a WxSat image to the down link telemetry cycle. I have severe noise problems on two metre receive so I never bothered to try to decode this signal but I'd certainly like to hear from anyone who was successful. The FM down link also carried good will messages from time to time. The last one commemorated the anniversary of the first moon landing by playing Glenn's "Small step for man" tape. This was operational until shortly before the untimely demise of AO-21.

## Home-brewers Report

I have received a number of replies on the subject of home brewing of satellite related equipment. It seems that this aspect of our hobby is alive and well. Dick is VK3ABK is putting together what is shaping up to be a fine satellite station. He is building G3RUH type modems and decoders. The antenna system is taking shape with crossed Yagis on 2 m and 70 cm on an azel mount with pre-amps at the feed point. Dick is obviously serious

about this satellite business. He is pressing into service some older type gear including a Yaesu FV-102 VFO and an IC-202 transmitter. Dick's approach is to do things properly but as cheaply as possible. So far the list of home brewers includes Dick VK3ABK, Bob VK3BNC, Ron VK6TF, Max VK3LMT and Mike VK3KYW. More of their exploits later.

Congratulations guys. More news on this front would be great. The initial response was unexpectedly high. Maybe we are not developing into a "plug and play" group after all.

## Digital Comms on Phase 3D

It's gradually becoming clearer that we can expect some rather spectacular goodies when phase 3D is operational. Lyle Johnson WA7GXD of the RUDAK-U development team recently reported on the progress of the digital comms package for phase 3D. It seems they are planning for as many as 10 channels operating simultaneously. There is also the possibility of, wait for it, a 256 kilobit/sec modem on board. This data rate would support real time motion video! RUDAK will be the prime comms path for the earth imaging cameras and will also be connected to the GPS, Global Positioning Satellite experiment.

The RUDAK system will use two computers, one based on an NEC V53 processor and the other on an Intel 386EX. They will each have 16 megabytes of error corrected memory. By comparison the microsats have 256 kilobytes of memory. The projected 10 year lifetime of phase 3D means that the designers have somehow had to ensure that tomorrow's users are not held back by today's technology. The "average user" will not be forgotten. Phase 3D's RUDAK will have a 1200 bps modem, a 9600 bps modem switchable to 19.2 kbps and maybe 38.4 kbps. Two DSP units, good for about 56 kbps, will complete the impressive line up.

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## Dish Feeds for 2.4 GHz and "S" Mode

An excellent article on this subject appeared in the Sep/Oct '94 edition of Amsat-NA's Journal. It is written by Ed Krome KA9LNV. Ed has a good practical approach to this subject and the article is easy to read even for first timers. He takes the reader through the fundamentals of dish design and then develops these ideas further into dish feed requirements. I've contacted Ed with a view to using parts of the article in this column.

The move to "S" mode is not as hard as many believe and once you get over that initial fear of microwaves it's fairly plain sailing. The old problem of "re-inventing the wheel" is still a possibility. Most of the texts available seem to presuppose a certain amount of experience. For this reason Ed's article is most welcome. I look forward to relating some of his thoughts in this column in coming months.

## News from VK5ESC (Equipment Supplies Committee)

In the Amsat-VK newsletter No 115, Graham reported a new high performance kit from the VK5 Equipment Supplies Committee. It is a 2401 MHz receive converter for "S" mode use. This will fill a gap in the market. The only alternatives appear to be to roll your own from scratch, a mighty task requiring lots of experience, or purchase something from overseas. There are a number of amateur suppliers in the States and Europe dealing in this sort of gear and it will be interesting to see how the VK5 converter stacks up against the competition. The new design uses a teflon PCB and an MGF1302 GaAsFET followed by MMICs. It has the usual 145 MHz output for use into any two metre amateur all mode receiver and offers the choice of two local oscillator designs.

I'd like to hear from anyone who has completed this converter, particularly if they could give an idea of how it compares with the older design and maybe how it lines up in comparison to the imported devices. We are really indebted to the VK5 ESC guys for the excellent efforts they have put in over recent years to get a lot of people on the air on satellites and VHF/UHF. Building your own can be a daunting task on these bands. As well as an array of kits they have a good stock of odd components that may prove difficult to source otherwise. You can obtain their catalogue by writing to them at PO Box 789, Salisbury, SA 5108. SASE, please.

359 Williamstown Rd, Yarraville VIC 3013  
Packet: VK3JT@VK3BTS

## AWARDS

John Kelleher VK3DP — Federal Awards Manager\*

The very best of Christmas cheer to all. Another year has passed with only praise from me for those who have participated in the Awards program. In the main, I think I have got it right for 99 percent of the contributors. The other one percent have sent me applications for certificates and applications (very nice applications, mind you), but they have left off identifying the country they have claimed for various callsigns now long extinct although they still apparently qualify for some unknown DXCC country. Maybe, if you were to follow this simple rule, I may not become "confused", as another well known amateur put it.

This month, after several requests for its publication, I will begin with the CQ WPX (World Prefixes) program.

### CQ WPX Award

The CQ WPX Award recognises the accomplishments of confirmed QSOs with the many prefixes used by amateurs throughout the world. Separate distinctively marked certificates are available for two-way SSB, CW and mixed modes. All applications for WPX certificates must be submitted on the official application form CQ 1051A. This form can be obtained by sending a four by nine inch SAE to the WPX Award Manager, Norm Koch K6ZDL, PO Box 880, CR-13, Clovis NM 88101, USA.

All QSOs must be made from the same country. All call letters must be in strictly alphabetical order, and the entire call letters must be shown. All entries must be clearly legible. Cross-mode contacts are not valid for CW or two x SSB certificates.

Certificates are issued for the following modes and number of prefixes: Mixed (any mode) — 400 prefixes; CW and SSB — 300 prefixes. Separate applications are required for each mode. Cards need not be sent, but they must be in the possession of the applicant. Any and all cards may be requested by the WPX Award Manager or by the CQ DX committee. The fee for each certificate is \$US4.00 for CQ magazine subscribers (with recent mailing label) or \$US10.00 for non-subscribers.

### Prefixes

The two or three letter/numerical combination which forms the first part of any amateur call will be considered the prefix. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. The following would be considered different: W2, WA2, WB2, WN2, WV2, K2, KA2, KB2, etc.

Any prefix will be considered legitimate if its use was licensed or permitted by the governing authority in that country after 15 November 1945.

### WPX Honour Roll

This certificate recognises those operators and stations that maintain a high standing in confirmed, current prefixes. The rules, therefore, reflect the belief that Honour Roll membership should be accessible to all active amateurs, and not be unduly advantageous to the "old timers". A minimum of 600 prefixes is required to be eligible for the Honour Roll. Special issue prefixes will be considered current for as long as they are assigned to a particular country, and deducted as credit for Honour Roll standings one year after cessation of their use or assignment. It follows, therefore, that Honour Roll standings may have to be updated annually.

### VERON Jubilee Award

The Dutch amateur radio society VERON celebrates its 50th anniversary in 1995. During this jubilee year, beginning 1 January 1995, they are issuing the VERON Jubilee Award.

This award can be applied for by all licensed radio amateurs who are able to establish contact with at least 100 stations in the Netherlands during the entire year of 1995. SWLs may also apply for the award. All bands and modes can be used. No QSL cards and no fees are required.

If you wish to apply for the award, send an extract of your log to the Award Manager, Sytse Wyberg, Certificate Manager VERON, Pr Bernardlaan 60 8501 JG Joure, The Netherlands. Applications close in March 1996.

### Worked Republic of India Award

The Amateur Radio Society of India presents the revised rules for the "Worked Republic of India" award.

1. Available for QSOs (CW, AM, SSB and RTTY) on any HF band (160 to 10 m, including WARC bands) with stations in mainland India, the Lakshadweep (Laccadives) and the Andaman and Nicobar Islands, on or after 26 January 1950.
2. Original QSL cards, or log extracts, duly certified by an office bearer of the country's IARU-Recognised Member society, should be submitted to the Awards Manager. An accompanying



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Cat D-3630

**2 Year Warranty \$699**

### Specifications

#### General

Frequency range: Transmit 144-148 MHz  
Receive 140-174MHz  
Channel steps: 5, 10, 12.5, 15, 20, 25 & 50kHz  
Current Consumption: Receive: 400mA  
Dimensions: 160 x 50 x 180mm (w/o knobs)



#### Receiver

Intermediate Freq: 21.4MHz & 455kHz  
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Maximum AF Output: 2.0 watts into 8 ohms @ 10% THD

#### Transmitter

RF Output power: 50/25/5 watts (Hi/Med/Low)



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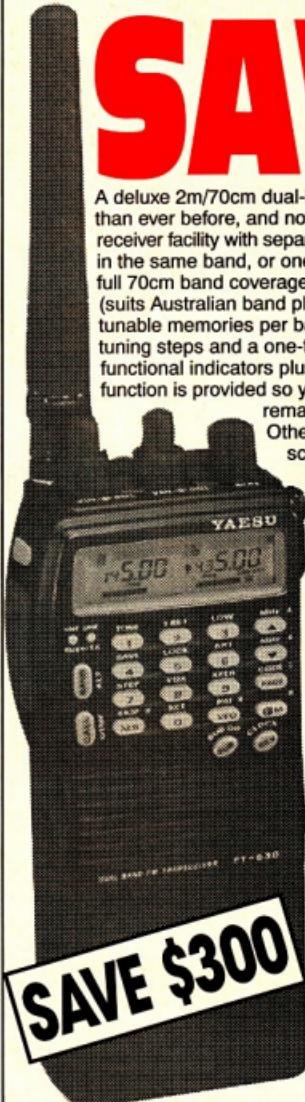


## FT-2200 Compact 2m Transceiver

The new FT-2200 is a compact, fully featured 2m FM transceiver providing selectable power output of 5, 25 and 50 watts, and includes the latest convenience features for more enjoyable mobile or base station operation. Built around a solid diecast chassis, it provides 49 tuneable memories, a large variety of scanning modes, an instant recall CALL channel, 7 user-selectable channel steps from 5kHz to 50kHz and is just 140 x 40 x 160mm (not including knobs). Backlighting of the large LCD screen, knobs and major buttons is even automatically controlled to suit ambient light conditions.

Also provided is a 38 tone CTCSS encoder, DTMF based paging and selective calling with Auto-Page/Forwarding features, and 10 DTMF auto-dial memories. The LCD screen provides a highly legible bargraph Signal/P.O. meter plus indicators for the various paging and repeater modes. An optional internal DV-3 digital recording/playback board can also be controlled from the front panel, giving even greater messaging flexibility. Supplied with an MH-26D hand microphone, mobile mounting bracket and DC power lead.

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# SAVE \$300!

A deluxe 2m/70cm dual-band hand-held transceiver offering easier operation and more features than ever before, and now at an unbelievably low price! The FT-530 provides a flexible dual receiver facility with separate volume and squelch controls, allowing you to listen on two frequencies in the same band, or one frequency on both bands! Plus, the exclusive Australian version features full 70cm band coverage (420-450MHz), selectable Auto Repeater Shift on both 2m and 70cm (suits Australian band plan), and extended receiver coverage as standard. Two VFOs and 41 tunable memories per band are provided, together with keypad or dial frequency entry, seven tuning steps and a one-touch CALL channel. The dual 5.5-digit LCD screen includes many functional indicators plus separate signal/P.O. bargraphs for both receivers. An LCD voltmeter function is provided so you can even monitor your battery's performance under load and estimate remaining battery life.

Other top features include: Inbuilt dual CTCSS encode/decode, CTCSS scanning, an auto battery saver (ABS) for extended battery charge life, a cross-band repeater facility and inbuilt clock with alarm and snooze functions. Also provided is VOX circuitry for use with the optional YH-2 headset, a user replaceable lithium back-up battery, and DTMF selective calling and paging. A DC supply jack allows transceiver powering and NiCad charging, with RF output in four steps up to 5W at 12V. The FT-530 comes complete with a high-capacity 1000mA/H NiCad battery, antenna, belt-clip, carry case and approved AC charger. Cat D-3620

#### Specifications

##### Frequency range:

Transmit	144-148MHz, 420-450MHz
Receive	130-174MHz, 420-500MHz, 800-950MHz

##### Current Consumption:

Auto power off	150uA
Standby (saver on)	16.8mA (both bands)
Dimensions:	55(W) x 163 (H) x 35mm(D)
Transmitter:	
Power Output:	5, 3, 1.5, 0.5 (at 12V)
RF Power Output	2.0W (2m), 1.5W (70cm) (Supplied 7.2V 1000mA/H NiCad)

##### Receiver:

Sensitivity:	2m: <0.158uV, 70cm: <0.18uV (Ham bands only, 12dB SINAD)
Audio Output	300mW at 8 ohms (at 12V)



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# End Of Year Specials!



Grab a Christmas bargain while stocks last. Prices are valid until 31st December 1994, and some items have only limited stock available. Some units may be shop soiled, but full warranties apply.

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Cat. D-1360      **\$179** **SAVE \$20**
2. Yaesu FT-26 2m handheld, with 700mA/H NiCad, carry case, extended receive, **2 year warranty**.  
Cat. D-3600      **\$399** **SAVE \$70**
3. Yaesu FT-415 deluxe 2m handheld, with 1000mA/H NiCad, carry case, extended receive and many more features.  
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4. Yaesu FT-815 deluxe 70cm handheld, with 1000mA/H NiCad, carry case, 430-450MHz coverage,  
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**CLEARANCE** Cat. D-3615 **\$499** **SAVE \$200**
5. Yaesu MH-12A2B standard speaker/mic.  
Cat. D-2115      **\$59.95** **SAVE \$10**
6. Yaesu MH-18A2B mini speaker/mic.  
Cat. D-2117      **\$49.95** **SAVE \$10**
7. Digitron 2m RF amplifier, 0.5 to 5w input, up to 30w output, GaAs Fet receive pre-amp, large heatsink  
Cat. D-2510      **\$139.95** **SAVE \$30**
8. Mastercharger intelligent fast charger suit handhelds, complete with cigarette lighter lead. Suits most Yaesu handhelds, optional adaptors for other models/brands.  
Cat. D-3850      **\$159.95** **SAVE \$10**
9. Yaesu FT-712R 70cm mobile transceiver, 35w FM output, 430-450MHz coverage, hand microphone,  
**2 year warranty** Cat. D-3330 **\$599** **SAVE \$150**
10. Yaesu FT-5200 deluxe 2m/70cm mobile transceiver, 50w output on 2m, 35w output on 70cm, 32 memories, **2 year warranty**  
Cat. D-3310      **\$1399** **SAVE \$100**
11. Revex W540 VHF/UHF SWR/PWR meter, made in Japan, covers 140-525MHz.  
Cat. D-1370      **\$179** **SAVE \$20**
12. Yaesu FT-840 H.F. mobile transceiver, **2 year warranty**, with hand microphone.  
Cat. D-3275      **\$1695** **SAVE \$200**
13. Yaesu FT-890 deluxe HF mobile transceiver, 160m-10m, extended receive, all mode (SSB,CW,AM,FM), RF speech processor.  
Cat. D-3270      **\$1995** **SAVE \$300**
14. Yaesu FT-990 HF base station transceiver, in-built auto antenna tuner and AC power supply, RF speech processor, DDS, digital audio filtering, IF shift and IF Notch, 500Hz CW filter standard. Ex-demo units only at this price!  
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Glen Iris 23 2222 • Homebush 23 2222 • Hurstville 580 6622 • Kotara 56 2092 • Liverpool 600 9888 • Maitland 33 7868 • Miranda 52 2722 • Newcastle 61 1896 • North Ryde 878 3855 • North Sydney (Greenwood Plaza) 964 9467 • Orange 618 400 • Parramatta 689 2188 • Penrith 32 3400 • Railway Square 211 3777 • Sydney City 267 9111 • Tamworth 66 1711 • Wollongong 26 3800 ACT • Belconnen (06) 253 2344 • Belconnen 379 7444 • Franklin 783 9144 • Geelong 232 711 • Highpoint 318 6300 • Melbourne City 399 Elizabeth St 326 6088 & 246 Bourke St 639 0396 • Richmond 428 1614 • Ringwood 879 5338 • Springfield 547 0522 QLD • Alderley 356 3733 • Booval 282 6200 • Brisbane City 229 9377 • Burleigh 391 6233 • Cairns 311 515 • Capalaba 245 2870 • Chermiside 359 6255 • Maroochydore 791 800 • Rockhampton 27 9644 • Southport 32 9033 • Toowomba 38 4300 • Townsville 72 5722 • Underwood 341 0844 SA • Adelaide City 232 1200 • Elizabeth 255 6099 • Enfield 260 6068 • St Marys 277 8977 • West Lakes 235 1244 WA • Cannington 451 8666 • Fremantle 335 9733 • Perth City 481 3261 • Midland 250 1460 • Northbridge 328 6944 TAS • Hobart 31 0800 • Launceston 344 555 NT • Darwin 81 1977

NEW STORE OPENS DECEMBER: 272 MOGGILL RD, INDOOROPILLY, QLD

B 1838

**DICK SMITH ELECTRONICS**

STORES ACROSS AUSTRALIA AND NEW ZEALAND

\*MAJOR AMATEUR STOCKIST STORES SHOWN IN RED

letter should clearly indicate the award desired.

3. Contacts with the same Indian station on different bands will count for points, but both stations must be fixed. Contact with, or from portable, maritime or aeronautical mobile stations are not eligible.
4. A minimum of 100 points should be earned to qualify for the award as per the table below, showing the number of points per QSO.
5. The fee for the award is five IRCs. If original cards are sent, additional IRCs should be included to cover return postage.

#### Points Table

Band	Mainland Stations	Stations in VU2	VU3	Sp Pfx	VU4 & VU7
160	3 pts	4 pts	5 pts per QSO		
80	2 pts	3 pts	4 pts per QSO		
40	2 pts	3 pts	4 pts per QSO		
20	1 pt	2 pts	3 pts per QSO		
10	1 pt	2 pts	3 pts per QSO		

Special prefixes such as VU9, VU25, VU40, AT0, etc must be clearly indicated on the QSL card.

The decision of the Awards Manager will be final and binding in all cases. Applications should be sent to Vice President and Awards Manager, Amateur Radio Society of India, 40 Ghalib Apts, Parwana Road, Pitampura, Delhi 110 034, India.

#### Ken Stevens VK5QW

Lastly, but importantly, allow me to introduce another member of the WIA DXCC Honour Roll, who is also a licensed rails bookmaker in South Australia. In his own words, Ken Stevens VK5QW has enjoyed the DXCC challenge, saying that long hours and plenty of patience made him a lot of wonderful friends. Ken is also interested in working US counties, which total 3067, so he has his work cut out for him.



Ken Stevens VK5QW, a member of the WIA DXCC Honour Roll.

\*PO Box 2175 Caulfield Junction 3161  
ar

## Club Corner

### Darwin Amateur Radio Club Cyclone Tracy Commemorative Event Station

The Darwin Amateur Radio Club (DARC) will be activating a special event station from 18 to 31 December 1994 as a 20th year commemorative recognising the devastation of Darwin on 25 December 1974 and the amateur radio involvement in the aftermath.

It is hoped to get the special event callsign V18TRACY, but this has not been confirmed as yet by the SMA.

Operating frequencies of this special event station will be as follows:

Phone	CW
3618 kHz	3530 kHz
7065 kHz	7009 kHz
14175 kHz	14009 kHz
21175 kHz	21130 kHz

Mark Sellers VK8MS

### Eastern and Mountain District Radio Club Exams

The EMDRC has reinstated a quarterly examination schedule for all licence classes. Exams will be scheduled in February, May, August and November of each year. SWLs or persons wishing to upgrade their licence are invited to contact the Club's Examination Manager, Geoff Atkinson VK3YFA on (03) 876 4850.

### EMDRC to go to the moon

A number of club members have recently been involved in the construction of two DL6WU 15 element antennas for Moonbounce on two metres. At press time preparations were being made to test the array on VE3ONT. Our aim is to enter the International EME competition in 1995. Interested? Contact Christopher Platt, VK3KCP on (03) 629 2653.

### Packet Kits

EMDRC has arranged for the supply of a high quality PCB and components to build the Baycom Packet Modem described in the July, 1993 issue of *Amateur Radio*. The kit will be available at the initial price of \$50.00. Contact Chris Travers VK3XGT on (03) 723 7126 to obtain your kit.

### February Guest Speaker — John Day on Packet

The guest speaker for the February Meeting will be John Day VK3ZJF from Daycom who will talk about and demonstrate Packet Radio. The last

presentation by John on this subject resulted in a full house, so be early! The meeting will be held at the Nunawading Council Offices, Maroondah Highway, Nunawading at 8.00 p.m. on Friday, 3 February, 1995

Christopher Platt VK3KCP

### Radio Amateurs Old Timers Club (RAOTC)

Members are reminded that there will not be a broadcast in January. Broadcasts on 6 February and 6 March 1995 will be at the same time as in November 1994.

Members having problems with reception of our 40 metre transmissions are reminded that there is a simultaneous transmission on 3.650 MHz.

### Ivan Hodder, ex VK3RH

I would appreciate hearing from anyone who can give me Ivan's current address as I have some information which would be of great interest to him.

Allan Doble VK3AMD

ar

## A. J & J COMAN ANTENNAS

Dual band Colinear 2M&70cm	\$ 95
2M colinear 2 5/8	\$ 93
12 ele 2M	\$123
6 M J-pole	\$109
6 M colin 6 dbd rad 4.NEW	\$150
6 ele 6 M	\$196
Duo 10-15 M	\$265
3 ele 15 M	\$190
3 ele 20 M	\$298
20 m log-yag array 11.5 dbd	\$685
M B Vert NO TRAPS 10-80 M	\$255
Tri band beam HB 35 C 5 ele	\$675
40 M linear loaded 2 ele	\$484
13-30 M logperiodic 12 ele	
all stainless/steel fittings	\$885
70 cm beam 12 ele ball/Feed	\$102
23 cm slot fed 36 ele brass cons	
solder-assembled, 18 dbd	\$170
80 m top load/cap/hat vert.	\$260
3 ele 40m l/lcap hats 60mm boom	\$785
2 m 144.190 2.2 wavelength boom	\$145

PLUS FREIGHT

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VISA ACCEPTED  
Call ANDY COMAN VK3WH.  
LOT 6 WEBSTERS ROAD,  
CLARKFIELD 3429  
PHONE 054 285 134

# DAYCOM

Australias Amateur Radio **SUPERSTORE!**  
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**MFJ** **MFJ** **MFJ** **MFJ** **MFJ**

NEW RTTY, ASCII, CW, AMTOR Decoder



NEW Voice Keyer voice memory unit



**MFJ** **MFJ** **MFJ** **MFJ** **MFJ**

SWR analyser family grows!  
Gets Resistance meter as well.

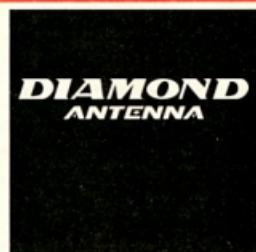


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NEW Solid State HF Linear Amplifiers



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**BUCKMASTER**  
**hy-gain**  
*by Telex*  
**OPTOELECTRONICS**

To bring you the best possible products at affordable prices is our aim. This year we bring you new products from well-known names and some new names with great products!  
LOOK INSIDE - you won't regret it!

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# SWR & Power meters

## HF & VHF SWR Analysers

The MFJ SWR Analysers are designed for the ultimate in convenience when tuning antennas, checking amplifiers and installing feed lines. They have a low level R.F. source, an SWR bridge and a fully automatic SWR calculating circuit that offers point and shoot convenience with excellent accuracy.

They cover all popular amateur and many commercial bands and can be powered by a 9V battery (not supplied) or an external 9-18V DC source.

<b>MFJ207</b> 1.8-30MHz	\$199
<b>MFJ208</b> 138-156MHz	\$199
<b>MFJ209</b> 1.8-170MHz	\$275
<b>MFJ217</b> 30-60MHz	\$199
<b>MFJ218</b> 150-170MHz	\$199
<b>MFJ219</b> 420-450MHz	\$225

### Crossed needle SWR/Wattmeters

Don't risk your expensive 2m or 70cm rig by transmitting without knowing your SWR! Shows peak or average forward and reflected power with power ranges of 200 & 20 watts forward, 5 & 50 watts reflected. At a glance you can see SWR, so there's no more mystery guessing illuminated, large, back-color meter makes reading easy. Black aluminium cabinet measures 184 x 114 x 90mm. Lamp uses 12 VDC (supplied externally).



**MFJ817** VHF/UHF SWR mtr \$199



**MFJ815B** HF SWR mtr \$175

### VHF & HF SWR & Wattmeters

The MFJ812B covers the 2M amateur band, reading forward and reflected power in two ranges (30 or 300 watts). Also lets you read relative field strength from 1-170MHz or SWR from 20 metres through 2 metres.

**MFJ812B** \$74.95

### HT power meter

Reads the output power of two metre hand-held transceivers. Five watts full scale with 50Ω BNC connector. 50 x 57 x 40mm

**MFJ840** \$45.00

### Terminating Power Meter



The PM-330 is a terminating type power meter for use from 1.8-500MHz. Full scale 0.5W to 120W in three ranges. Frequency range 1.8-500MHz. Impedance 50Ω±2%. VSWR <1.15 at 500MHz. Connector 'N' female. Size - 190Wx105Hx230D

**PM-330** Power meter \$279

## Digital readout 1.8-170MHz!



**MFJ249** SWR analyser

When the MFJ SWR Analysers were first introduced to Australia both Neil Duncan and Ron Fisher commented that it would be nice if they had a built-in frequency counter for accurately setting or reading the frequency. Well MFJ listened! Now MFJ has added a complete 150MHz counter into the SWR analyser. BUT then MFJ decided it should cover VHF as well so the MFJ249 covers 1.8-170MHz, without a break! Use it as a digital display for the internal signal source or as a frequency counter with .01, .1, 1 & 10 second gate times giving you 0.1Hz resolution!

Then MFJ said, well what about the serious HF guys who need to know the feedpoint impedance? Well the MFJ259 now gives you everything! SWR, resistance and a frequency counter all in one.



**MFJ259** SWR analyser \$549

### Noise Bridge

The MFJ202B has long been recognised as one of the world's finest noise bridges. Board mounted call board, resistance scale ±150pf and extended capacitance settings of 500pF and 2000pF. In range extender the MFJ202B covers the range from 1 to 100MHz with ease!

Works with any receiver or transceiver. Case size 106 x 108 x 50mm, uses 9V battery (not supplied)



**MFJ202B** Noise bridge \$149

### Bandswitching Dip meter

Works just like a Grid Dip Oscillator but has a bandswitch and uses only one external coupling coil rather than one for each band. No coils to change, no sensitivity control and you can connect a counter to accurately measure the frequency. Great for workbench and antenna work, the MFJ203 covers 1.8-30MHz in five overlapping ranges.

**MFJ203** DIP meter \$249.95

**MFJ206** RF Current probe \$199

### Solid state dipper

This modern, solid state, Dip Oscillator covers pretty well every need you can find for such a device. The DM-4061A covers the range 1.5 - 250MHz in 5 ranges, can function as a dip oscillator or an absorption wavemeter, plus has 2kHz modulation for receiver testing. Uses a single 9V battery (supplied) or an external source of 9-12V (not supplied).

**DM4061A** DIP meter \$175



This modern, solid state, Dip Oscillator covers pretty well every need you can find for such a device. The DM-4061A covers the range 1.5 - 250MHz in 5 ranges, can function as a dip oscillator or an absorption wavemeter, plus has 2kHz modulation for receiver testing. Uses a single 9V battery (supplied) or an external source of 9-12V (not supplied).



### High power wattmeters

The Mirage MP series wattmeters cover all amateur bands up to 1.3GHz

- Remote coupler mounting
- Peak or average reading
- No charts or graphs needed
- 5 year warranty
- Quality meter movement
- Operates on 9-13.8V DC

**MR-MP1** 1.8-30MHz 2kW \$367

**MR-MP2** 50-200MHz 1.5kW \$367

**MR-MP3** 420-450MHz 150W \$412

**MR-MP4** 1.26-1.3GHz 100W \$437

MFJ

# Antenna Tuners

MFJ

## 1.5kW Tapped inductor tuner



- Peak reading power and SWR meter with two ranges (200W & 2kW)
- Covers entire 1.8-30MHz range
- 6 position antenna switch for coax lines, random wire or balanced lines or external dummy load.
- Super heavy duty balun wound with Teflon wire
- Compact 273W x 514H x 381D all metal case

**MFJ962C** 1.5kW tapped inductor **\$520**

300W Deluxe tuner without dummy load



So you would like all of the features of the MFJ949E but don't want a dummy load? The MFJ948 is identical to the MFJ949E but has no dummy load!

**MFJ948** Deluxe 300W, no dummy load **\$292**

Tuners for 2metres & 70cm



**MFJ921** 2 metre tuner 300W **\$154**

**MFJ924** 70cm tuner 300W **\$154**

Tuner / Preselector for transceivers



The MFJ1040B helps you dig those weak signals out from the sludge which is not rejected by the front ends of some transceivers. This combination of a receive preselector and a 300W rated tuner could be just the trick! It also has 20dB attenuator, handles two receivers, two antennas and has automatic RF sensing bypass circuit. Covers 1.8-54MHz. Requires 12V DC.

**MFJ1040B** 300W tuner/preselector **\$222**

**NEW MFJ Tuner + Artificial Ground**

Throw up a random wire anywhere and work the world! Sounds great doesn't it, and the NEW MFJ934 combination tuner and artificial ground makes it possible. By putting the heart of an MFJ941E 300W antenna tuner with crossed needle SWR/power meter, and an MFJ931 artificial ground in one box you get everything you need for portable operation and you save money into the bargain!

When you don't need the artificial ground the MFJ934 functions as a normal tuner.



**MFJ934** Ground & tuner combined **\$365**

## 3kW Differential 'T' tuner



- 3kW Differential-capacitor & roller inductor
- New, more accurate directional coupler
- Current mode balun reduces feedline radiation
- 6 position antenna switch
- Continuous coverage from 1.8-30MHz
- Wide spaced capacitor for true 3kW rating
- Compact 273W x 514H x 381D all metal case

**MFJ986** 3kW Differential - T **\$652**

300W Deluxe tuner with dummy load



- Full 1.8-30MHz coverage
- Peak and average reading crossed needle SWR/Power meter (can be illuminated)
- Built in 300W dummy load
- 6 position antenna switch
- 4:1 balun for balanced lines or long wires
- Full 12 month warranty

**MFJ949E** Deluxe 300W with 'the lot'

The smallest VersaTuner!



The smallest of the VersaTuner range. Size: 127 x 64 x 150mm. Power rating: 200W. Match dipoles, vees, random wires, beams and mobile whips with either coax or balanced line feed from 1.8 to 30MHz

**MFJ901B** 200W Versatuner **\$135**

Long-wire tuner



**MFJ16010** 200W Long wire tuner **\$93.90**

**MFJ931 Artificial Ground**



Does your rig bite? Well, maybe it isn't hungry — it could just be that the ground connection you have is not adequate. A specialised tuner with an RF current meter, the MFJ931 can tune a piece of wire or an existing ground wire to place an RF earth right at the transceiver. Covers 1.8-30MHz, measures 190 x 89 x 178mm.

**MFJ931** Ground system tuner **\$176**

## 3kW Deluxe tuner



- Widest matching range for lowest possible SWR!
- High-Q roller inductor positioned for best efficiency
- Extra heavy contact pressure for greatest reliability
- Covers entire 1.8-30MHz range
- 50Q 300W Dummy load built in
- 6 position antenna switch
- Compact 273W x 514H x 381D all metal case

**MFJ989C** 3kW Deluxe

300W General purpose tuner



The **MFJ941E** covers the full 1.8-30MHz range, has front panel-mounted antenna switch, 12 position tapped inductor, 4:1 balun and sturdy metal case. Size: 267W x 73H x 178D .

**MFJ941E** 300W general purpose tuner **\$247**

## 300W Mobile tuner



The **MFJ945D** has a crossed needle SWR/power meter and is equally at home in the car, caravan, motel room, tent or your home station. Small size: 200W x 25H x 150D.

**MFJ945D** 300W mobile tuner

**QRP Portable antenna tuner**



The **MFJ971** tuner can be used at any frequency across the entire 1.8-30MHz HF spectrum. Rated at 200W this versatile little tuner matches the MFJ CW transceivers and MFJ940 SSB transceiver in size and can be fastened to them.

- Crossed needle SWR/power meter
- Covers 1.8-30MHz
- 4:1 balun included
- Dimensions: 165Wx63.5Hx152D

**MFJ971** Portable tuner

**Mobile antenna matcher**



Help your mobile rig run better with this simple yet effective mobile antenna matcher. Measures 64 x 64 x 40mm

**MFJ910** Mobile antenna matcher **\$42.70**

# lots of antennas!

## 2mtr 3 el Yagi



The unique design of the MFJ1763 3 element 2mtr yagi allows it to be assembled and disassembled in seconds! Ideal for portable or emergency use, can be mounted vertically or horizontally for either FM or SSB operation and it exhibits low SWR right across the two metre band.

Can be kept easily in the boot of your car.

**MFJ1763 \$97.00**

## 2mtr 1/4λ g-plane



■ 2mtr unity gain vertical

■ Fits 25-40mm mast

**MFJ1740 \$32.50**

## 2mtr 5/8λ g-plane



■ 2mtr gain vertical

■ Fits 25-40mm mast

**MFJ1750 \$49**

## Duplexers and Triplexers

For dual band or triple band transceivers, multiple radios or sharing a run of coax the duplexers and triplexers offer low loss and excellent isolation for a variety of applications. The M connector shown in the table is an improved UHF type for lower losses.

Model	Bands	Common Connector	Separate Connectors	Price
<b>DUPLEXERS HF or 2m / 70cm</b>				
MX27N	L/PF: 1.8-30MHz & 1.8-10MHz B/PF: 400-900MHz	(M)	L/PF: N/M B/PF: N/M	<b>\$89</b>
MX27H	(M)	L/PF: N/M B/PF: N/M	<b>\$89</b>	
<b>TRIPLEXERS HF or 6m or 2m / 70cm / 23cm</b>				
MX3000	L/PF: 1.8-16MHz & 1.8-10MHz B/PF: 400-900MHz	(N)	L/PF: N/M B/PF: N/M	<b>\$159</b>
MX3000N	(N)	L/PF: N/M B/PF: N/M	<b>\$159</b>	
<b>TRIPLEXERS HF or 6m / 3m / 70cm</b>				
MX29N	L/PF: 1.8-50MHz & 1.8-10MHz B/PF: 300-950MHz	(M)	L/PF: N/M B/PF: N/M	<b>\$159</b>
MX2900D	(M)	L/PF: N/M B/PF: N/M	<b>\$158</b>	



## Outdoor Active Antenna

The MFJ1024 is an active receiving antenna designed for use out of doors. Mounted away from sources of electrical noise the MFJ1024 offers the opportunity for reception of signals in the range 50kHz to 30MHz where other types of antennas are just not practical.

The indoor control unit has a 20dB attenuator, adjustable gain, a receiver switch to select between two receivers and an antenna switch to select either the active outdoor antenna unit or an auxiliary antenna. Measures 150 x 75 x 125mm. The remote unit has the 1370mm whip attached to the amplifier box which is supplied with a mounting plate and hardware to suit most situations. Fifteen metres of RG58 coax with the appropriate plug fitted is supplied connected to the unit. Just hook it up and go! Requires 12V DC supply (not supplied).

**MFJ1024 Outdoor active antenna**

**\$293**

## 2mtr 5/8λ magbase



Need a bit of extra punch when mobile? Try this for size and magnetic base convenience!

**MFJ1728B \$37.50**

## Dual Band ground plane



The same size as the MFJ1740 but for both 2 metres and 70cm!

**MFJ1754 \$62.50**

## Dual band mag-base mobile

With a heavy magnetic base this 19 inch tall antenna is 1/4λ on 2mtrs and 5/8λ on 70cm, with 4.5mtrs coax and plug. Has BNC adaptor for HTs!

**MFJ1724B \$36**

## 2mtr 1/2λ J pole



The ideal travelling companion. Roll up your MFJ1730 and stick it in your pocket! J-pole type antennas are omnidirectional, have good gain and need no ground plane.

**MFJ1730 \$37.50**

## TERLIN Outbacker™

OUTBACKER™ antennas are pretuned multiband whips with a separate tap for each band. These models are supplied set up for all amateur bands from 80 through 10 metres. Fine tuning can be done with the extendible tip on the antenna.

Get hold of the Australian antennas designed for Australian conditions when you want to go mobile!

When you come to mount your antenna why not look at the Terlin spring base? The OUTBACKER™ spring base is machined from billet brass, chrome plated for protection. The spring is zinc plated steel, all insulators are Nylon. The base is mounted with a 1/2inch bolt on the bottom while the antenna base (3/8 UNF stud) screws into the top. Coax fitting is SO-239.

**MT120 Outbacker 1.2m long**

**MT121 Outbacker 1.7m long**

**MT122 Perch 2.1m long**

**MT123 Outbacker Spring base**

**\$273**

**\$300**

**\$327**

**\$110**

## All band Preselector/tuner



A low cost solution for receiving only where tuning and/or preselection is required. For use at long, medium or short wave, this handy little unit covers 150kHz to 30MHz. Has tuner bypass and receive grounding provisions.

**MFJ956 Tuner / Preselector**

**\$99.00**

## Receiving tuner/preamp



Don't miss that rare DX station because your receive antenna wasn't tuned correctly! With the MFJ959B you can provide proper impedance matching for optimum signal transfer and up to 20dB of preamplifier gain. A 20dB attenuator helps reduce overload problems. Select between two antennas and two receivers. Requires 9-18V DC, 229 x 50 x 150mm.

**MFJ959B Receiving tuner / preamp**

**\$225**

## Selective HF Active Antenna

Preselector circuitry minimises intermodulation, provides additional RF selectivity and reduces the effects of noise from outside the band you have tuned. Inbuilt RF amplifier lets you use the MFJ1020A as a preselector with an external aerial. Covers the frequency range 300kHz to 30MHz. Operates from 9V battery (not supplied) or external 9V battery, 12V DC supply, 127 x 50 x 150mm plus telescoping whip.



**\$99**

**MFJ1020A Selective active antenna**

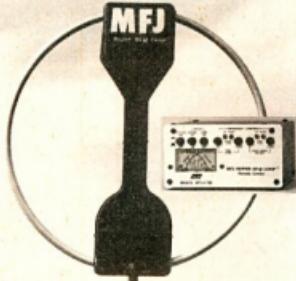
**\$199**

# even more antennas!

## Super-LOOP

The MFJ1786 loop is fully welded from aluminium tube for better Q, lower losses and reduced microphonics compared to others made with flat strip. Ideal for portable operation, flat dwellers, caravan parks or anywhere space is limited. Needs no radials, counterpoise or antenna tuner. MFJ's Super Hi-Q Loop is remotely tuned, but needs no control cable, everything is carried on the coax! Remote control unit for operation from 12V DC or internal battery supplied.

- Small, only 915mm diameter
- Tubular radiator for better performance
- VERY quiet receiving antenna
- Remote controller supplied
- Built-in crossed need SWR/Power meter
- DC powered for convenience



**MFJ1786**

10-30MHz continuous coverage loop

**\$625**

## HF roll-up dipoles

Just the thing to use with the MFJ9020, or any other QRP HF transceiver! Light-weight, easy to carry, easy to put up.



**Efficient 80 & 40 metre vertical**

Designed as a high performance antenna for 80 and 40 metres, the MFJ1792 features a full size quarter wave radiator for 40 metres — that's a full 10 metres of ruthless radiating power!

End loading, the most efficient form of loading, is used for 80 metres. This is accomplished by a virtually lossless 1.3m capacitance hat and a high-Q coil wound with Teflon™ covered wire on a low loss fibreglass form.

The entire length of the antenna is always radiating power. It has a unique built-in L-network for lowest SWR, is made of high strength 6061-T6 aluminium tubing, super strong solid fibreglass insulating rod and stainless steel hardware.

Handles 1500 watts PEP SSB, includes heavy duty mount. Antennas of this size require guying.

For best possible performance on these low bands you need to use radials, counterpoises or a ground screen.

TRI-BAND version — the MFJ1793 is the same size as the MFJ1792 but includes a full size quarter wave radiator for 20 metres.

**MFJ1792**

80/40m vertical

**\$359**

80/40/20m vertical

**\$405**

**MFJ1770 15mtr \$87**  
**MFJ1771 17mtr \$87**  
**MFJ1772 20mtr \$87**  
**MFJ1773 30mtr \$87**  
**MFJ1774 40mtr \$87**

## Half-wave vertical

The MFJ1796 is a truly low-cost half wave, ground independent vertical antenna for 40, 20, 15, 10, 6 & 2 metres.

Standing only 3.6m high and with a tiny 40cm foot print the MFJ1796 is a truly useful antenna. Light enough to be handled by just about anybody, but a serious antenna at the same time. Efficient, high-Q loading coils and an air core balun combine to reduce losses. Durability is assured by the use of heavy walled aluminium tubing, machined aluminum parts and stainless steel hardware. All coils are wound on tough, low loss, ceramic formers using high durability Teflon™ coated wire. Teflon™ insulated coax is used from the decoupling balun to the feedpoint.

A half-wave section for six metres and for two metres adds versatility. You can individually adjust the MFJ1796 on each band. Adjusting one band has minimal influence on other bands.

- Covers 40, 20, 15, 10, 6 & 2 metre bands
- Needs no radials or ground plane
- Made from highest quality materials
- Only 3.6m high

**MFJ1796**

6 band half-wave vertical

## For 2 m & 70cm

The MFJ Pocket Linear family has been acclaimed, both here and overseas, as the greatest thing to happen to HTs since the rubber ducky itself! Gives you a significant increase in range and performance.

**MFJ1710** (left) is a 3/8 wave telescoping antenna for 2 metres. Collapses to fit in shirt pocket, complete with clip. Approx 133mm long collapsed, approx 522mm extended.

**MFJ1710 \$24.90**

**MFJ1712** (centre) is a wonder for dual band use. Collapsed (184mm) it is a 1/4 wave on 70cm, extended, (482mm) it is a 1/4 wave on 2 & 5/8 waves on 70cm.

**MFJ1712 \$37.50**

**MFJ1714** (right) is an end fed half wave for two metres which leaves nothing else just looking rather sad! Acclaimed in ARAs as "the best I have ever used" by VK3CE. He should know, he owns one! Needs no groundplane. When collapsed it works like a rubber ducky.

**MFJ1714 \$42.50**

The NEW MFJ FlexiDuck antennas are compact antennas for your hand held offering high performance. They can't stab you — they will bend, flex and twist with your ideal where you need gain but can't take the time for using a solid antenna such as the 'Pocket Linear' family.

**MFJ1711** (right) is a 400mm long FlexiDuck which gives top performance in a safe, easy to use antenna for your 2 metre or 70cm hand-held. The MFJ1711 is a full size half-wave on 70cm and a full size quarter wave on 2 metres.

**MFJ1711 \$44**

The **MFJ1716** (centre) is a full-size quarter wave on 70cm and a loaded half wave on 2 metres. 223mm tall.

**MFJ1716 \$38**

**MFJ1718** (left) is the efficient 108mm "ShortyDuck" for 2 metre hand-holds. Impedance matched for maximum gain the MFJ1718 employs a high-Q helically wound resonator.

**MFJ1718 \$30**

## 2m/70cm duplexer

Nowadays we seem to use so many multi-band mobiles, hand-holds and antennas, but often we need to use two radios or two antennae! Obviously we need a duplexer. The MFJ1916 duplexer is a compact, low-loss unit for 2m/70cm antennas or radios. UHF socket on common port, UHF plugs on separate ports.

**MFJ1916 2m/70cm duplexer**

**\$69**

## 10 band 80-2m vertical

Self supporting and only 6.1 metres tall the MFJ1798 requires no ground radials and offers terrific performance on 10 amateur bands from 80 through 2 metres.

Separate full size radiators are used on 20, 17, 15, 12, 10 and 2 metres. On 6 metres the 17 metres radiator becomes the main radiator. The active radiator works as a stub to decouple everything beyond it. In phase antenna current flows in all parallel radiators. This forms a very large equivalent radiator and gives you very wide bandwidths. The radiator stubs provide automatic bandswitching, and there is absolutely no loss associated with loading coils or traps.

On 40 and 30 metres the MFJ1798 employs highly efficient top-loading to give excellent bandwidth, an efficient low radiation angle and automatic bandswitching.

- 10 bands - 75/80, 40, 30, 20, 17, 15, 12, 10, 6 & 2 metres
- Separate full size radiators
- End loading for 80, 40 & 30 metres
- Elevated top feed for better performance
- Low radiation angle
- Very wide bandwidth

**MFJ1798**

10 band half-wave vertical

**\$599**

# Antenna accessories

## Heavy duty 4 pos coax switch

**Lightning Protection, centre ground pos'n.**

The MFJ1704 series switches are designed for use up to 500MHz and are offered with UHF or type-N connectors. They handle a full 2.5kW PEP with extremely low SWR. Isolation is better than 60dB at 30MHz and still >50dB at 500MHz.



**MFJ1704** with UHF(F) connectors **\$132.50**

**MFJ1704N** with N(F) connectors **\$157.50**

## MFJ1701 6 positions SO239

The MFJ1701 is a six position switch intended for use up to 2kW PEP in 50 to 75Ω systems at frequencies up to 30MHz. A high quality ceramic wafer switch is used and unused terminals are grounded.



**MFJ1701** 6 position HF switch **\$78.50**

## Remote Coax Switches



The Ameritron RCS-4 is a remote controlled coax switch that selects one of four outputs by supplying all control voltages through the coax cable itself. You get two units, a switching box that mounts outside on the tower or wall and the control console placed at your operating position.

No. of positions 4  
Loss at 30MHz <0.05dB  
VSWR <1.1:1 from 1.8-30MHz  
Power 1.5kW ave  
2kW PEP

Switching time 50ms  
**RCS-4** 4 pos remote switch **\$297**

The RCS-8V switch allows you to remotely select up to five antennae, so you can replace five runs of coax with one. Your RCS-8V will handle up to 2kW up to 30MHz and 1kW up to 150MHz. Uses 8 core cable (not supplied) to connect the two units.

No. of position 5  
Loss (150MHz) <0.05dB  
VSWR <1.2:1 DC-250MHz  
Impedance 50Ω  
Power 5kW below 30MHz  
1kW at 150MHz

**RCS-8V** 8pos HF/VHF rmt switch **\$328.80**

## Heavy duty 2 pos coax switch

**Lightning Protection, centre ground pos'n.**

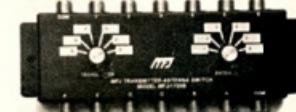
The MFJ1702B is a redesigned version of this very popular switch that combines new features, such as a centre grounded position and 2.5kW PEP (1kW CW) rating for use in 50Ω systems. The new MFJ1702BN, with 'N' type connectors, rates up to 1.1GHz. Isolation >60dB @ 300MHz and >50dB @ 450MHz. Insertion loss <0.2dB, SWR <1:1.2.

**MFJ1702B** with UHF(F) connectors **\$49.50**

**MFJ1702BN** with N(F) connectors **\$72.00**

## MFJ1700B 2 x 6 positions SO239

The MFJ1700B has two ceramic rotary switches that let you select 1 of 6 antennas and 1 of 6 transceivers in any combination. Rated 2kW PEP for 50-75Ω loads, unused terminals grounded.



**MFJ1700B** 2 x 6 position HF switch **\$148.00**

## Diamond coax switches



Diamond coaxial switches are designed for high performance up to 1000MHz for UHF connector types and to 3000MHz for the 'N' connector type. Rated at 1.5kW they offer extremely low SWR and insertion loss with excellent isolation throughout their frequency range.

**DM-CX210A** 500MHz UHF(F) connectors **\$79**

**DM-CX210N** 3GHz N(F) connectors **\$149**

## Low-Pass filters for HF

This is the best low pass filter we have tested. Crafted from the finest materials the Bencher low pass filter offers a minimum of 80dB attenuation in tests conducted to measure the harmonic suppression in Ch 2 TV and higher.



**MT093** Bencher Lowpass filter **\$109**

## MFJ Lowpass Filter

Eliminate or minimise TVI with the MFJ low pass filter. Ensure your transceiver does not cause harmonic interference to your neighbour's TV. Rated to carry 1.5kW from DC-30MHz, SWR <1.5:1, minimal insertion loss, high harmonic attenuation.



**MFJ704** Lowpass filter **\$80.50**

## 50Ω Dummy Loads

### 1kW DC-400MHz



The MFJ250X handles 1kW CW or 2kW peak for 10 min., 200W CW or 400W PEP cont. Fill with transformer oil (not supplied). Low VSWR: 1.2:1 to 40MHz, 1.5:1 30-300MHz, 2:1 300-400MHz. Safety vent with removable cap. SO-239 connector, measures 191 H x 168 DIA, with carrying handle.

**MFJ250X** 1kW type load **\$75.00**

### 1.5kW DC-650MHz

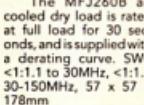


Another MFJ first! This load will handle 1.5kW for 10 seconds, 100W for 10 minutes. SWR <1.1:1 at 30MHz, <1.3:1 at 650MHz and usable to 750MHz. Measures 75 x 75 x 178mm.

**MFJ264** 1.5kW load UHF connectors **\$135.00**

**MFJ264N** 1.5kW load N connectors **\$158.00**

### 300Ω DC-150MHz



The MFJ260B air cooled dry load is rated at full load for 30 seconds, and is supplied with a derating curve. SWR <1.1:1 to 30MHz, <1.5:1 30-150MHz, 57 x 57 x 178mm

**MFJ260B** 300W load UHF connectors **\$75.00**

**MFJ260BN** 300W load N connectors **\$89.00**

### 50Ω Load resistors



These precision 50Ω carbon on ceramic resistors are the same high quality parts used in the MFJ260B and MFJ264 loads.

**RA38** ..... \$52.03 **RA39** ..... \$86.40

### Coax-Seal sealant



If you have any type of outdoor antenna you should be using Coax-Seal® sealant. Coax-Seal is a black rubber based material especially designed to protect any outdoor connection or connector.

Coax-Seal is a non-conductive, non-contaminating, waterproof substance which remains flexible at any temperature. Coax connectors are not waterproof, and exposed solder connections will deteriorate.

Available in two sizes — please enquire for volume pricing.

**HD124** CoaxSeal 12.7mm x 1.5m **\$5.50**

**HD125** CoaxSeal 25mm x 14.5m **\$14.50**

# AMERITRON

## Valve & Solid State HF linear

ALS-500M 600W SOLID STATE 13.8V DC LINEAR



**ALS-500M**

600W PEP solid state linear

**\$1850**

AL811 600W PEP HF Linear amplifier

- Fully solid state - no tuning
- 600W PEP, 400W CW output
- Continuous coverage 1.5 - 30MHz
- Load fault & thermal protection
- Excellent harmonic suppression
- Compact: 89 x 229 x 381mm weighs 3.5kg
- Requires 13.8V @ 80A peak

Now, an economical fully solid state amplifier for mobile, portable or base station use. With less than 100W drive into the low SWR input of the ALS-500M you get a full, quiet 600W PEP output. This amplifier is well protected and is built with traditional American made Ameritron pride and quality.



No tuning, no fuss, no worries,  
just turn on and operate!

The revolutionary new Ameritron ALS-600 amplifier is unique – it uses four rugged TMOS RF Power MOSFET transistors to deliver 700W PEP with a clean output and unrivalled solid state performance.

Intended for base station operation, the ALS-600 is supplied with a multi-output 50V power supply complete with power supply voltage and current metering.

- Output 700W PEP, 600W CW
- Continuous coverage 1.8-30MHz
- Instant bandswitching, no tuning, no warm-up
- SWR protection prevents amplifier damage.
- Over power protection with ALC.
- Extremely quiet!
- Compact, 152 x 241 x 305mm
- 12V DC output to power accessories
- Choke input power supply for improved regulation and reduced AC line current peaks.
- Fully tested in Australia before delivery.

The matching ALS-600PS power supply, supplied with the ALS-600 is the same size as the amplifier and supplies 50V DC at up to 25A for the amplifier.

Power supply can be mounted out of the way to reduce clutter and congestion on your operating bench.



Shades of the magnificent past! Remember the days when a power amplifier looked like it meant business and was heavy enough to convey the message? Well those days are back! Ameritron's AL811 uses three 811A tubes in Class AB2 grounded grid to deliver a clean, comfortable 600W PEP. The AL-811 amplifier needs only 40W of drive for the VK legal limit.

**AL811**

600W PEP HF linear

**\$1460**

AL1200 - 3CX1200A7 1.5kW PEP

With a serious transmitting tube and a serious Peter Dahl 'C' core transformer the AL-1200 is an extremely rugged, yet affordable linear. QSK available as an option.



**AL1200 1.5kW PEP linear amp**

**\$4850**

AL-1500 - 3CX1500 1.5kW PEP

With only 65W drive the 3CX1500(B877) in the AL-1500 will deliver a full 1.5kW PEP



**AL600**

700W PEP HF linear

**\$2995**

AL80B - 3-500Z 1000W PEP

Combine Ameritron's Dynamic ALC technology with instantaneous RF Bias and an Eimac 3-500Z and you have one of the best possible 1kW linear you can buy. QSK available as an option.



**AL80B 1kW PEP linear amp**

**\$2850**

AL82 - 2 x 3-500Z 1.5kW PEP

The classic contesteer's linear with a pair of Eimac 3-500Z tubes and a 1.8kW power supply. Like all Ameritron linear it covers 160-10 metres.



**AL1500 1.5kW PEP linear amp**

**\$6050**



**AL82 1.5kW PEP linear amp**

**\$4650**

**AL811H 800W PEP linear amp**

**\$2095**

QSK-5 PIN DIODE QSK switch

Utilising the latest in PIN-diode technology the QSK-5 will handle 2.5kW PEP, 2kW CW in normal amateur service with SWR <1.5. Handles 750W in continuous modes like RTTY, SSTV and FM. Connected externally to the amplifier. Extremely quiet in operation. Optional cooling fan will permit 1500W continuous operation.



**QSK5 2.5kW QSK switch**

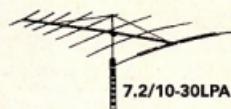
**\$785**

# KLM

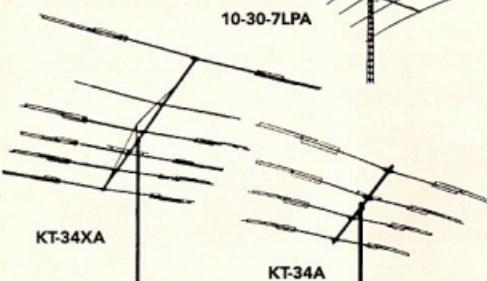
ANTENNAS, INC.

## HF Log Periodics

Model	10-30-7LPA	7.2/10-30LPA
Frequency MHz	10-30	7.2/10-30
Gain dBd	7typ	3.7typ
Length M	9.15	12.8
Elements	7	8
Price	\$2500	\$2900



7.2/10-30LPA



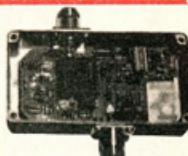
10-30-7LPA

KT-34XA

KT-34A

Model	KT-34A			KT-34XA		
Frequency MHz	14-14.35	21-21.45	26-28.97	14-14.35	21-21.45	26-28.97
Gain dBd	7	7	7	8.5-9	9-9.5	11-11.3
Elements	4			6		
Length mtrs	4.87			9.76		
Price	\$1250			\$1800		

## GaAs-FET VHF & UHF Preamplifiers



These preamplifiers from Mirage Communications use the latest in GaAs-FET technology to provide every keen VHF/UHF amateur with a line of high quality amplifiers for use indoors or at the masthead. Mastmount versions as well as in-shack types are available.

Mirage preamps can be controlled and powered by radios such as the ICOM IC-271/471 & 275/475/575 which have internal preamp power supply and control facilities.

- Automatic RF switching
- GaAs-FET for best performance
- In-line design for ease of operation
- Switchable gain settings
- Gain of >20dB, Noise figure < 0.6dB
- Power handling 160W
- Power - nominal 13.8V DC
- Mast mount (KP2) has DC coupler supplied

KP1/10M	28-30MHz In-shack preamp	\$279
KP1/6M	50-54MHz In-shack preamp	\$279
KP1/2M	144-148MHz In-shack preamp	\$279
KP1/70cm	430-450MHz In-shack preamp	\$279
KP2/10M	28-30MHz Masthead preamp	\$329
KP2/6M	50-54MHz Masthead preamp	\$329
KP2/2M	144-148MHz Masthead preamp	\$329
KP2/70cm	430-450MHz Masthead preamp	\$329

When the quest is for excellence in antennas there can only be one result... and this is it!

## From one of the world's great antenna manufacturers, just for you!

Every KLM antenna is designed with the amateur in mind, but with no sacrifice of quality. Made from only the best weather-resistant materials, Lexan insulators and all stainless steel hardware, these are some of the best possible the best you can buy, but they also have a price tag to match. The entire range is shown on these pages. Many types are held in our warehouse for immediate delivery. Others are usually available within 4 to 6 weeks from the USA. So whatever your interests try KLM and enjoy!

### What makes one manufacturer stand out?

In the case of antennae it is simple. The designs must be good. These, they have been created by some of the best designers in the business. The materials must be good. These are, because only the best will do for the craftsmen at KLM. They select only the best quality aluminium alloys for booms and elements, all stainless steel hardware, precision-moulded insulators and the best quality materials for baluns and chokes. The antennas must work, and without doubt the owners of KLM antennae will tell you that their antennas do work.

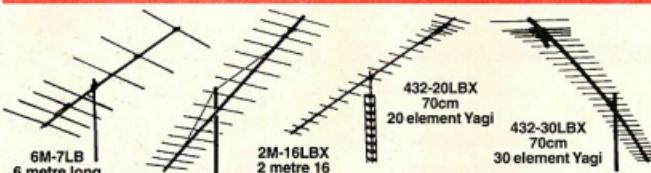
Time and again the products of this one company have been proven to perform beyond expectations by commercial, government and amateur users. Place your faith in KLM and you can be assured of spare parts availability for many years to come as well as one of the best antennas you could get, why would so many people want to copy them? Trouble is you can never rely on the copy to perform as well as the original! Can you?

## HF Monoband beams & Rotatable dipoles

Model	20M-6	20M-5	20M-4	15M-6	15M-4	10M-6	10M-4
Frequency MHz	13.9-14.4	13.9-14.4	13.9-14.4	21-21.5	21-21.5	25-30	28-30
Gain dBd	11	9.7	7.7	11	7.7	11	7.7
Length M	17.38	12.8	6.4	10.97	4.27	8.38	3.05
Elements	6	5	4	6	4	6	4
Price	\$2300	\$1640	\$1060	\$1325	\$576	\$830	\$525

Model	80M-3	80M-2	80M-1	40M-4	40M-3	40M-2	40M-1
Frequency MHz	3.5-4	3.5-4	3.5-4	7.7-8	7.7-8	7.7-8	7.7-8
Gain dBd	7	4	0	7.2	6.5	4.9	0
Length M	18.3	10.98	NA	12.8	9.76	4.88	NA
Elements	3	2	1	4	3	2	1
Price	\$10500	\$5900	\$1930	\$2300	\$1700	\$1250	\$510

## VHF & UHF Antennas



6M-7LB  
6 metre long boom Yagi

2M-16LBX  
2 metre 16 element Yagi

432-20LBX  
70cm  
20 element Yagi

432-30LBX  
70cm  
30 element Yagi

Model	6M-5	6M-7LB	2M-8	2M-11X	2M-13LB	2M-16LB	40-10X	40-16X	420-470	420-450	425-440	430-440
Frequency MHz	50-52	50-52	144-148	144-148	144-148	144-148	400-410	400-410	420-430	420-430	425-440	430-440
Gain dBd	8.7	11.5	10.3	12.5	13.3	14.5	11.5	13.5	15.3	17.3	15.3	17.3
Length M	3.6	7.85	2.21	4.67	6.55	9.54	1.45	3.66	3.76	6.68	3.76	6.68
Elements	5	7	8	11	13	16	10	16	20	30	20	30
Price	\$522	\$760	\$254	\$218	\$248	\$506	\$171	\$319	\$378	\$443	\$378	\$443

## 23cm (1.2 GHz) ANTENNAS

The KLM antenna range for 23cm are all supplied completely assembled and pre-tuned at the factory, with the exception of the 44 element version which is in two pieces requiring only simple assembly.

Model	1.2-15LBX	1.2-24LBX	1.2-44LBX
Frequency MHz	1280-1300		
Gain dBd	13.6	16.2	18.2
Elements	15	24	44
Length mtrs	1.07	1.92	3.76
Price	\$238	\$285	\$398

## SATELLITE ANTENNAS

Every KLM satellite antenna is supplied with all necessary phasing harness and a remote polarisation switch. Non-conducting fibreglass booms, rotator systems and complete tracking systems are also available.

Model	2M-14C	2M-22C	425-18C	425-40CX
Frequency MHz	144-150	144-148	420-450	420-440
Gain dBd	11	13	12	15.2
Elements	2x7	2x11	2x9	2x9
Length mtrs	3.89	5.82	2.23	4.45
Price	\$423	\$553	\$550	\$589

## Butternut is back!

Butternut Electronics Co. has been producing what are possibly the world's most loved vertical antennas for amateur HF use for many years. Whether you need 80 & 40 metres or all 9 bands, eighty through 6 metres, you will find a Butternut combination to suit. The ever popular HF-6V can have 160 metres added to it, as can both the HF-9V and the HF-2V.

All Butternut antennas and accessories are in stock at Dayton right now, just waiting for your call!

### Butternut HF-6V

Butternut's most popular vertical, covers 80-10-metres, 12 & 17 metres can be added with the A1712 kit, 6 metres with the A6 kit and 160 metres with the TBR-160S kit. The HF-6V can be used with any of the Butternut accessories listed on this page.

#### Electrical and Mechanical Specifications

Shipping weight: 5.4 kg.  
Height: 7.9 m.  
Feedpoint impedance: nominal 50Ω through included matching line.  
VSWR at resonance: 1.5:1 or less on all bands in typical ground level or above ground installations.

Bandwidth for VSWR of 2:1 or less:  
10 metres — 1500 kHz  
15 metres — entire band  
20 metres — entire band  
30 metres — entire band  
40 metres — 280 kHz

Power Rating: 1.5kW SSB and CW all bands  
Wind loading: 0.49 sq. metres  
Unguyed wind survival: 129 km/h assuming no icing or precipitation

#### Installation

Comes complete with 0.6m. tubular mounting post (15.8mm. O.D.) for direct placement in earth or into standard steel TV mast (19mm. O.D. with 1.5mm wall) or Butternut Mounting Post Sleeve (Model MPS). Eye-level adjustment of 80, 40 and 30 metre resonator coils; length adjustment on 15 and 10 metres; 20 metre adjustment is a function of 40 and 30 metre tuning. Coils for 80/75, 40 and 30 metres are 4.76mm diameter aluminium wire, air wound and self supporting; typical spacing between adjacent turns is 12.7mm. or greater.

**HF6V** 6 band HF vertical \$423

### 18 & 24 MHz WARC Band Adaptors

Allows the Butternut 5 and 6 band verticals to operate on the 18 and 24 MHz WARC bands with full automatic switching. Model A-17-12 (not shown)

**A1712** 17 & 12 metre add-on kit \$100

### 160 Metre Adaptor (Model TBR-160-S )

Attaches to the base of Butternut HF verticals for automatic bandswitching 160 through 10 metres with a slight reduction in 80/75 metre bandwidth. 160 metre bandwidth for 2:1 SWR is 10-20 kHz depending on ground losses. Rated at 500 watts CW - 1200 watts PEP input to final.

**TBR160S** 160 metre add-on kit \$160

### 30 metre Resonator Kit

Model 30 MRK Resonator kit for 30 metre operation. Not for use with Top Loading Kit.

**30MRK** 30 metre add-on kit \$100

### Top Loading Kit 80 - 40 Metres

Model TLK Top loading kit of 4 x 7.60mm stranded umbrella wires. Provides increased bandwidth and efficiency on 80 and 160 metres. (The top loading kit cannot be used with the 30 metre resonator).

**TLK** Top loading kit for 80 & 160 mtrs \$48

### Roof Mounting Kit (Model RMK-2 )

For model HF6/9V and other Butternut verticals. Includes 2-ft tripod tower, ST-II radial kit, mounting post sleeve (Model MPS), plated lag screws and complete instructions. Shipping weight: 4.9 kg.

**RMK2** Roof mounting kit \$155

### Butternut HF-9V

The Butternut HF9V-X is the same as the HF6V-X but includes WARC bands and the 6 metre kits in a single package.

Bandwidth for less than 2:1 SWR:

6 metres	1MHz
10 metres	1500 kHz
12 metres	200kHz
15 metres	entire band
17 metres	200kHz
20 metres	entire band
30 metres	entire band
40 metres	280 kHz
80/75 m.	40 to 100 kHz

**HF9V** 9 band HF vertical

\$529

### DX the 80 & 40 Metre Bands

Self-supporting vertical antenna designed for optimum performance on the 80 and 40 metre bands. Features full automatic band switching using Butternut's exclusive Differential Reactance Tuning™ system. Provides greater radiation at lower wave angles.

#### Electrical and Mechanical Specifications

Height: 9.75 m.  
Feedpoint impedance: 50Ω.  
VSWR at resonance: 1.5:1 or less  
Bandwidth for VSWR of 2:1 or less: 40 metres full band  
Wind loading: 80 metres 90 kHz  
Power Rating: 1 kW 80 & 40 metres  
Unguyed wind survival: 97 km/h

**HF2V** 80 & 40 metre vertical

\$400

### A radial vertical that covers 80 or 75 metres?

#### THERE IS ONE NOW!

No, we won't insult your intelligence by telling you that it's a "half wave" or that ANY vertical will operate more efficiently without a good radial system than with one; it certainly won't! But if you've no room for even the smallest radial system just install the most efficient multiband vertical in the business, the HF9V, over our counterpoise kit BN-CPK. You'll not only save a tidy sum but you'll work DX that the shorter and more lossy no-radial "half-waves" can't touch because both the HF6V and HF9V use longer active element lengths for higher radiation resistance and greater efficiency on more bands than any of the so-called half-waves. Ask for the free brochure and receive technical note DLS-1 "Dirty Little Secrets from the Antenna Designer's Notebook" that shows you how to calculate the probable efficiency of any vertical antenna using the manufacturer's own specs — so you won't have to learn the truth the hard way!

### Counterpoise Kit

Model CPX Counterpoise Kit for Butternut models HF6V-X and HF9V-X substitutes for ground or elevated radials. Self-supporting tubing bolts onto base of antenna. Mass not provided.

**CPK** Counterpoise kit

\$110

### Stub Tuned Radial Kit (Model STR-2 )

Kit of four stub-tuned radials for 40, 20, 15 and 10 metres, each 11.8m long and completely assembled with end insulators. Also includes coil of #18 copper-clad steel wire and insulators for four 30 metre radials (7.3m) and one 75/80 metre radial (maximum length 20.7m).

**STR2** Stub tuned radial kit

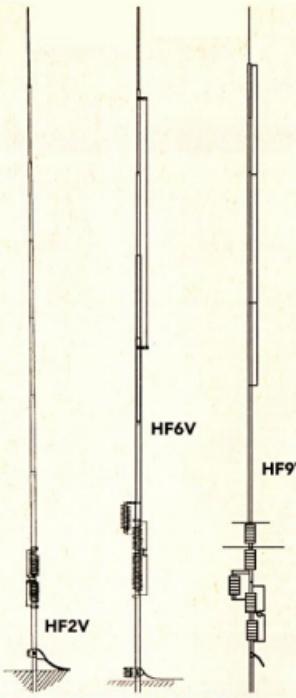
\$100

### Mounting Post Sleeve (Model MPS )

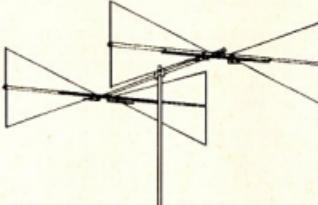
A 600mm. tube of 32mm. diameter aluminum to accommodate mounting post of HF6/9V. May be left in earth for easy removal of antenna and mounting post, recommended as protection in installations where U-bolts or locking bolts contact the mounting post.

**MPS** Mounting post sleeve

\$20



**Butternut HF5B MiniBeam**



For gain where you really didn't think it was possible! The BUTTERNUT HF5B "Butterfly" beam is designed for those locations where just about any other rotatable antenna won't fit. This compact beam uses no messy traps and can be turned with a small rotator. High quality stainless steel hardware is used throughout to ensure your HF5B will last.

#### HF5B specifications:

Bandwidth for <2:1 VSWR:

10 metres 1500kHz

12,15,17m entire band

SWR at resonance: ≤1.5:1

Gain: 10 metres 5dBD

12 metres 5dBD

15 metres 5dBD

17 metres 0dBd

20 metres 3dBD

Front to back ratio: 20dB

Front to side ratio: 30dB

Power handling: 1kW

Feed impedance: 50Ω

Wingspan: 3.84m

Boom length: 1.83m

Turning radius: 2.12m

Vertical spreaders: 1.83m

**HF5B** 5 band mini-beam

\$650



**RMK2** Roof mounting kit

\$155

## HF Yagis



### World Ranger

Multiband YAGIS for 10, 12, 15, 17, 20, 30 & 40 M

Our three and four element triband beams provide the versatility and performance you need for reliable communications around the world. Cushcraft's World Rangers are made to last with 6063-T832 aluminum tubing, weatherproof traps, stainless steel hardware and fiberglass insulators. They are designed with fewer parts for easier assembly, lower weight and less windload.

The add-on kits shown below can be used to add 30 or 40 metres to the A3S and A4S or 30 metres to the unique WARC band A3WS dual band beam.

Model	A4S	A3S	A3WS
Frequency, MHz	28.2,14	28.2,14	24,18
Number of elements	4	3	4
Forward gain, dB	8.9	8	8
Front to back ratio, dB	16	14	14
Power, watts PEP	2000	2000	2000
Beam width, degrees	5.40	4.27	4.27
Longest element, mm	9.75	8.45	7.66
Turning radius, mm	5.40	4.72	4.4
Max mast size, mm	55	55	55
Wind load, square metres	.51	.47	.38
Weight, kg	18.0	12.5	10.24
Price (inc tax)	\$1099	\$916	\$689

### World Ranger 30 & 40 mtr add-on kits

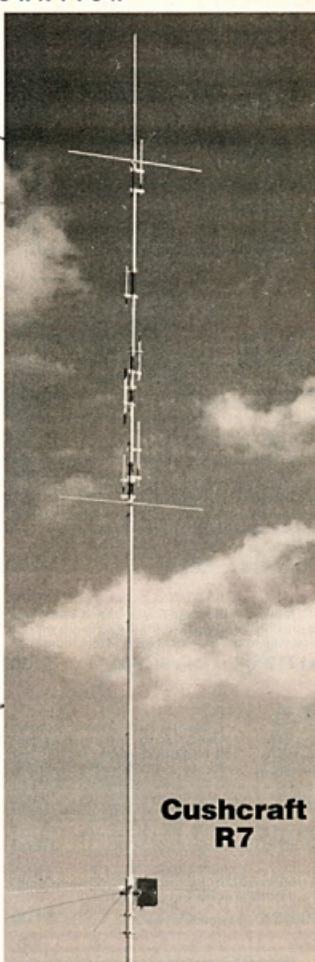
Model	A743	A744	A103		
Frequency, MHz	7	10	7	10	15
Driven element length	10.72	8.08	10.72	8.08	9.8
Wind load, square metres	.06	.23	.06	.23	.05
Bandwidth, MHz	1.25	1.25	1.25	1.25	1.25
Power, watts PEP	2000	2000	2000	2000	2000
Weight, kg	1.5	1.05	1.6	1.05	1.5
Price (inc tax)	\$299	\$299	\$299		

### ROTATABLE DIPOLES



Model	D40	D8	D30	D3W
Frequency	7	28.21,14*	28.21,14	24,18,10
Bandwidth, MHz	200	>200*	>200	>200
Power, watts PEP	2000	2000	2000	2000
Length, metres	12.88	10.92	7.86	10.37
Wind load, square metres	.12	.12	.09	.08
Weight, kg	2.5	5.1	4.1	8
Price (inc tax)	\$507	\$566	\$419	\$429

Cushcraft rotatable dipoles come in four models: a single bander for 40 metres, three and four banders, as well as the new D3W for three WARC bands. Their size means they can be mounted high above trees for better performance than a wire dipole without the worry of a tribander on a tall mast or tower.



## HF vertical and beam antennas

### Multiband HF verticals

Half-wave verticals for 7,10,14,18,21,24,28 MHz R5,R7

IT'S THE ONE YOU'VE ASKED FOR! Amateur radio's most popular vertical antenna design now gives you 30 & 40 metres WITH NO GROUND RADIALS! Only 6.9 metres (22.5 feet) tall, the R7's small footprint and ground independence gives you mount anywhere flexibility. Ideal for confined spaces and unobtrusive in home units, the R5 and R7 offer simple assembly (it takes about sixty minutes) automatic frequency selection and only 7 short (1 metre) counterpoise rods mean you worry about DXing, contesting or rag-chewing, not what the neighbours or XYL think!

Convenience is only one reason to own a Cushcraft R5 or R7 vertical—the main reason is performance. The only connection to your rig is a single coax. No band switching, no remote tuning and you can have amateur radio's best performance to size ratio antenna on 30 & 40 metres—a total of SEVEN bands today!

Model	R5	R7
Frequency, MHz	28.24,21,18,14	28.24,21,18,14,10,7
Gain, dBi	3	3
Electrical length	Half-wave	Half-wave
SWR 2:1 bandwidth	Full band	Full band
Power, watts PEP	1800	1800
Radiation angle	16°	16°
Height, metres	5.2	6.9
Max mast size, mm	45	45
Wind load, square mtr	.13	.21
Weight, kg	4	5.6
Price (inc tax)	\$702	\$937

### HF Verticals

#### 80 - 10 metres

As well as the popular and very successful half-wave verticals, the R5 and R7, Cushcraft offers three, five and eight band quarter wave verticals with high quality, heavy duty construction with all stainless steel hardware. These compact antennas are ideal wherever you have the space for ground radials but not for a beam antenna.

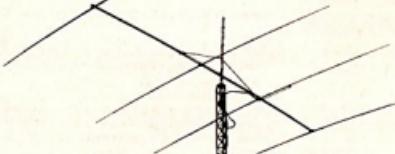
For use with any of these antennas the APR18 radial kit consists of 6 pre-cut radial assemblies with connecting lugs all ready to attach to the base of the antenna.

Model	AV3	AV5	APBA
Frequency MHz	28.21,14	28.21,14,23	14,18,23
Gain, dBi	3	3	3
Electrical length	1/4 wave	1/4 wave	1/4 wave
SWR 2:1 bandwidth	Full band	Full band	80MHz-40MHz
Power, watts PEP	2000	2000	2000
Radiation angle	16°	16°	16°
Height, metres	4.2	7.4	7.92
Max mast size, mm	40	40	40
Wind load, square mtr	2.3	3.09	4.23
Weight, kg	10	19	14
Radials required	Normally 10		
Radial kit to suit	APR18 (set of 6) \$130		
Price (inc tax)	\$207	\$424	\$535

### Cushcraft R7

#### Skywalker Monoband Yagis

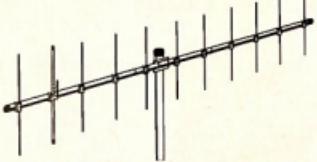
##### 20-4CD



Model	10-4CD	10-3CD	TEN-3	15-4CD	15-3CD	20-4CD	20-3CD	40-2CD
Frequency	28.23	28.27	28.27	21.25	21.25	21.25	14.14	14.14
Number of elements	3	3	5	4	4	4	3	2
Forward gain, dBi	8	8	10	8	10	8	5.5	
Front to back ratio, dB	30	30	25	30	30	30	30	20
Power, watts PEP	2000	2000	2000	2000	2000	2000	2000	2000
Boom length, metres	4.88	3.05	2.44	6.10	4.27	9.75	6.1	6.9
Longest element, mm	5.34	5.38	5.49	7.11	7.06	11.0	10.96	12.8
Turning radius, mm	3.5	3.05	3.0	4.72	4.11	7.2	6.1	7.29
Max mast size, mm	50	50	50	50	50	50	50	50
Wind load, square mtr	.29	.21	.20	.42	.32	.75	.51	.57
Weight, kg	11.4	5	4.5	11.4	9.1	25	13.7	30
Price (inc tax)	\$507	\$390	\$264	\$605	\$517	\$1072	\$750	\$1072



## FM Yagis

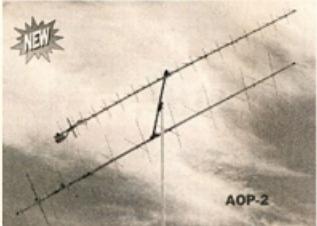


For both voice and for packet operation, Cushcraft's FM Yagis and Boomer FM Yagis are ideal choices no matter what type of operation you are interested in. High gain, clean radiation patterns, ease of assembly and materials of the highest quality are all part of the story.

Model	A148-3S	A148-10S	A148-20S
Frequency, MHz			
Number of elements	3	10	20
Forward gain, dBi	7.8	13.2	16.2
Front to back ratio, dB	25	26	24
Power, watts PEP	1000	1000	1000
Boom length, metres	.85	3.6	2.1x3.6
Turning radius, mtrs	.8	1.8	2.0
Max mast size, mm	51	51	51
Wind load, square mtr	.02	.11	.26
Weight, kg	.7	2.7	8.8
Price (inc tax)	\$92	\$163	\$447

## OSCAR Antennas

Here's the system to get you going for amateur satellite operation. The Cushcraft AOP-2 'OSCAR Pack' includes the 73BXB for 70cm, and the 22XB for 2meters. The 70cm antenna has a polarisation switching relay and the pack includes all details and dimensions for assembling your own OSCAR antenna system.



AOP-2

Model	22XB	73BXB
Frequency, MHz	144-148	432-438
Gain dBi	14	15.5
2:1 SWR Bandwidth	40dB	6MHz
Max Power PEP	600W	250W
Boom length	5.9	4.37
Turning radius	3.35	2.6
Wind load sq mtr	.24	.13
Weight	5	3.5
Price	\$560	\$536

## Blitz Bug Lightning arrestors

The Cushcraft Blitz Bug arrestors uses a patented three point static discharge cell design. They have a sealed chamber, constant static drain and controlled discharge. Blitzbugs are rated at 2kW on 500MHz with negligible insertion loss.



LAC-1

**\$28.80**

**\$28.80**

# VHF & UHF Vertical and beam antennas

## Boomer FM, SSB and CW Yagis

The Cushcraft Boomer range are state of the art VHF and UHF Yagis, supplied complete with all necessary mounting hardware. The 26BZ is a combination of two 13BZs and a cross boom for vertically polarised FM use.

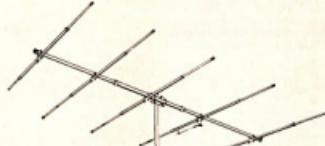


13BZ

Model	13BZ	13BWB	13BZ	13BZ	26BZ	26BZ
Frequency, MHz	35.00	74.4-148	144-148	144-148	144-148	144-148
Number of elements	6	4	13	17	28 (8)	24
Forward gain, dBi	14	10.2	15.8	18	18.8	19.2
Front to back ratio, dB	28	28	28	28	28	28
Power, watts PEP	2000	2000	2000	2000	2000	2000
Boom length, metres	10.36	1.22	4.57	9.45	4.57	9.3
Turning radius, mtrs	2.67	1.04	1.02	1.64	1.02	2.4
Max mast size, mm	32	22	32	32	32	32
Wind load, square mtr	.90	.30	.90	.90	.90	.90
Weight, kg	.45	.60	.77	.76	.77	.21
Price (inc tax)	\$810	\$141	\$274	\$472	\$776	\$215

## Sideband Yagis

The performance of these budget antennas will surprise you! They are light weight, durable and easy enough to assemble that you will be on air in an afternoon. Good bandwidth, tapered elements and direct 50Ω matching with the Cushcraft 'Reddi-Match' make these fine antennas a delight to use.



Model	A55-05	A55-05	A55-05	A148-70	A148-105	A350-115
Frequency, MHz	50.54	50.54	50.54	144-148	144-148	430-450
Number of elements	3	6	8	7	11	11
Forward gain, dBi	14	18.2	17.2	17.2	17.2	17.2
Front to back ratio, dB	20	20	20	20	20	20
Power, watts PEP	1000	1000	1000	1000	1000	1000
Boom length, metres	12	37	61	25	38	34
Turning radius, mtrs	30	30	30	18	18	18
Max mast size, mm	32	32	32	32	32	32
Wind load, square mtr	.30	.40	.38	.30	.31	.30
Weight, kg	.11	.25	.41	.18	.31	.14
Price (inc tax)	\$205	\$369	\$449	\$100	\$163	\$116

## Lightning arrestors

Protect your valuable equipment from lightning induced surges of up to 5000 amperes with a Cushcraft constant impedance arrestor! The LAC4 series have replaceable gas tubes which clamp surges to about 50V in about 100 nanoseconds, much quicker than the voltage rise time of lightning pulses.

LAC4	200 watt with UHF connectors	<b>\$81.30</b>
LAC4H	2kW with UHF connectors	<b>\$89.40</b>
LAC4N	200 watt with N connectors	<b>\$105.70</b>
LAC4NH	2kW with N connectors	<b>\$109.80</b>
LC2	200 watt replacement cartridge	<b>\$34.55</b>
LC2KW	2kW replacement cartridge	<b>\$38.62</b>

The LAC4 series have replaceable gas tubes which clamp surges to about 50V in about 100 nanoseconds, much quicker than the voltage rise time of lightning pulses.

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## Ringo verticals

### 10, 6, 2 metres & 70cm

The basic Ringo family are 1/2 wavelength designs which have the antenna connected to the mast for DC and so have built in lightning protection. Nor do they build up static charge like many other designs to interfere with your enjoyment of the amateur VHF and UHF bands.

Model	AR-10	AR-6	AR-2	AR-450
Frequency, MHz	26.97	50.64	135-180	435-465
SWR 2:1 Bandwidth, MHz	>1.5	2	10	20
Gain, dBi	3.75	3.75	3.75	3.75
Power, watts FM	1000	1000	1000	1000
Radiation angle	7°	7°	7°	14°
Height, metres	5.26	3.1	1.2	4.9
Max mast size, mm	32	32	32	32
Wind load, square mtr	.06	.02	.01	.01
Weight, kg	1.82	1.14	.56	.45
Price (inc tax)	\$136	\$136	\$98	\$94

## RINGO RANGER

For that bit of extra gain where space does not permit the installation of decoupling radials for an antenna such as the AR2X2 then the ARX2 is for you.



RINGO RANGER II

Cushcraft's Ringo Ranger II has more gain, less wind load and greater mechanical integrity than other two meter antennas. You will readily appreciate the benefits of this amazing antenna! The Ringo Ranger II has built-in lightning protection, UV stabilised insulators, heavy duty heavy wall tubing, improved decoupling radials to prevent feed line radiation and all weather performance only available in antennas costing many times more. It's the performer – over 500,000 have been sold world wide!

Model	AR2XB	ARX2B
Frequency, MHz	135-160	435-450
SWR 2:1 Bandwidth, MHz	>10	>10
Gain, dBi	7	7
Power, watts FM	1000	1000
Radiation angle	7°	7°
Height, metres	4.3	1.5
Max mast size, mm	32	32
Wind load, square mtr	.05	.02
Weight, kg	2.73	.5
Price (inc tax)	\$140	\$140

## Dual Band Rings

Experience the performance and appearance advantages of an all-aluminium dual band antenna. The AR270 and AR270B incorporate Ringo Ranger technology in a lightweight and durable design with all stainless steel hardware.

A single coax is all you need to get your new dual band rig working to its full performance!

Model	AR270	AR270B
Frequency, MHz	144-148	435-450
SWR 2:1 Bandwidth, MHz	>4	>15
Gain, dBi	3.7	5.5
Power, watts FM	250	250
Height, metres	1.13	.23
Max mast size, mm	51	51
Wind load sq mtr	.03	.044
Weight, kg	.91	1.09
Price (inc tax)	\$178	\$254

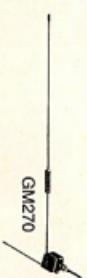
The NEW AR270B has two ½λ elements on 2metres and four ¼λ elements on 70cm. It is broadbanded for minimum SWR on both bands. It is easy to assemble with three rigid aluminium tubing sections, a durable mast mount and factory sealed coils for best performance.



## Glasmaster® On-glass antennas

- 144-148 / 430-440 MHz
- 2.6dB gain @ 2m
- 6.3dB gain @ 70cm
- VSWR <1.5:1
- Power: 50 Watts
- Field tunable
- 4.3m RG-58 cable
- PL-259 plug fitted
- Modern black finish

**GM270 \$119**



**GM144 \$79.95**

- 144-148MHz
- 2.6dB gain
- VSWR <1.5:1
- Power: 50 Watts
- Field tunable
- 4.3m RG-58 cable
- PL-259 plug fitted
- Modern black finish

**GM144 \$79.95**

- Replacement whip for GM144
- Whip, base and remount kit

\$19.80  
\$49.80

- Replacement whip for GM270
- Whip, base and remount kit

\$23.80  
\$71.80

- Remount kit for either model

\$17.50

### 5 Bands mobile

- 75, 40, 20, 15 & 10 metres
- 1.22m mast with  $\frac{1}{4}$ -24 thread
- 40/75m easily tunable
- Resonators & top section included
- Parts available separately

**AB5 \$239**

### HF Monoband whips

- Available for all HF bands
- 1.22m helical lower section with 1.22m stainless steel whip section
- Very economical
- Lightweight
- Strong fibreglass forms



### $\frac{1}{4}$ -24 antenna mounts



**MM3401 \$120**

Triple mag mnt



**VL-105AD \$12**

$\frac{1}{4}$ -24 to SO-239

**VL-105ADT \$15**

Heavy duty mount



**VL-219 \$22**

Bumper mount

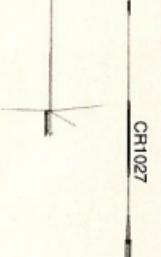
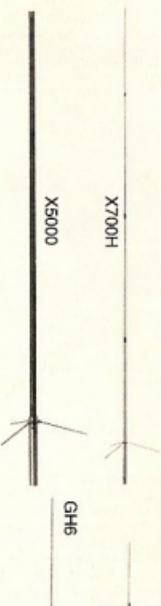
**SS504 \$22**

HD Spring

## The finest from Japan!

DIAMOND Antenna is one of the most respected names in Japan, with a huge range of HF, VHF and UHF mobile and base station antennas. Made only from the highest quality materials and finished to perfection DIAMOND is an antenna to be proud of!

**DIAMOND ANTENNA**



Model	Bands	Gain	Power	VSWR	Length	Radial Length	Weight	Max Dia	Price
<b>Triple band base station antennas</b>									

X7000	2m 70cm 25cm	8.3dBi 11.7dBi 10.5dBi	100W 100W 100W	<1.5:1	5m	52cm	2.2kg	30-62 mm	\$399
X6000	2m 70cm 25cm	6.5dBi 9.0dBi 8.0dBi	100W 100W 100W		3.05m	52cm	1.8kg		\$359
X5000	2m 70cm 25cm	4.5dBi 8.3dBi 7.1dBi	100W 100W 100W		1.8m	19cm	900g		\$299
X4000	2m 70cm 25cm	3.1dBi 5.5dBi 4.9dBi	100W 100W 100W		1.3m	19cm	700g		\$279

Model	Bands	Gain	Power	VSWR	Length	Radial Length	Weight	Max Dia	Price
<b>Dual band base station antennas</b>									

X700H	2m 70cm	9.3dBi 13dBi	200W	<1.5:1	7.2m	52cm	3.8kg	30-62 mm	\$599
X510M	2m 70cm	8.3dBi 11.7dBi	200W		5.2m	52cm	2kg		\$389
X510N	2m 70cm	8.3dBi 11.7dBi	200W		5.2m	52cm	2kg		\$389
X400	2m 70cm	7.9dBi 11.6dBi	200W total		4.6m	52cm	2.2kg		\$299
X300	2m 70cm	6.5dBi 9.5dBi	200W		3.1m	52cm	1.5kg		\$249
X200	2m 70cm	6dBi 8dBi	200W		2.5m	52cm	1.2kg		\$229
X50	2m 70cm	4.5dBi 7.2dBi	200W		1.7m	19cm	900g		\$169
X30	2m 70cm	3.8dBi 5.5dBi	200W		1.3m	19cm	800g		\$149

Model	Bands	Gain	Power	VSWR	Length	Radial Length	Weight	Max Dia	Price
<b>Single band GH series verticals</b>									

GH28	28-52 MHz	3dBi	1kW PEP	<1.5:1	5.1m	60cm	2.8kg	25-42 mm	\$159
GH10	27-28 MHz	3dBi	300W AM		5.6m	60cm	2.8kg		\$149
GH92	30	6dBi	1kW PEP		6.3m	1.5m	2.7kg		\$199
GH6	50 MHz	3.4dBi	200W PEP		3.4m	1.5m	1.8kg		\$149

Model	Bands	Gain	Power	VSWR	Length	Radial Length	Weight	Max Dia	Price
<b>Triple band 6m/2m/70cm vertical</b>									

V2000	6m 2m 70cm	2.15dBi 6.2dBi 8.4dBi	150W	<1.5:1	2.5m	92cm	1.3kg	30-62 mm	\$249
<b>N series mobile whips</b>									

N407	2m	8.4dBi	50W		960mm	250g	\$135		
N510	2m 70cm	3dBi 5.5dBi	200W						
N516	2m 70cm	4.5dBi 7.2dBi	120W		1.63m	500g	\$179		
<b>CR series mobile whips (UHF base)</b>									

CR427	6m 70cm	2.15dBi 7.2dBi	120W 100W		1.51m	450g	\$169		
CR1627	10m 70cm	2.15dBi 7.2dBi	250W 100W		1.61m	450g	\$199		
CR9	6m	2.15dBi	200W		200g	\$89			
<b>SG series mobile whip</b>									

SG6000	6m	2.15dBi	200W	<1.5:1					\$129
<b>DIAMOND HF mobile whips</b>									

## DIAMOND HF mobile whips

Diamond HF whips are available as complete assemblies (MD4020 shown on right) or as a whip element (MD200) to which you add bottom loading coils. Buy the whip and add coils as you need them. Base and mount are extra.

Model	Description	Price
<b>HF Mobile whip</b>		
MD4020	40 metre mobile whip, 2m long	\$299
<b>HF Mobile whip system</b>		
MD200	Mobile whip element without loading coil	\$179
MDC89	80m interchangeable loading coil	\$139
MDC40	40m interchangeable loading coil	\$129
MDC20	20m interchangeable loading coil	\$129
MDC15	15m interchangeable loading coil	\$119
MDC10	10m interchangeable loading coil	\$119
MDC6	6m interchangeable coil	\$119

MD4020



# hy-gain®

by Telex



**Hy-Gain AR40 - .28m<sup>2</sup>**

For small communication antennas up to .28m<sup>2</sup>, the AR40 is an economical rotator using a disc brake and low voltage control. Ideal for medium size VHF/UHF arrays.

- Dual 12 ball bearing race
- Automatic position sensor
- Fully automatic control
- Solid state control
- Low voltage operation
- Maximum mast size 52mm
- Includes lower mast support

**AR40** rotator

**\$503**

**Hy-Gain CD4511 - .79m<sup>2</sup>**

The same external dimensions as the AR40 but heavier duty, the CD4511 will handle a 4 element tri-bander or that bigger VHF array with ease.

- Dual 48 ball bearing race
- Diecast ring gear
- Stamped steel gear drive system
- Illuminated directional indicator
- Snap action control switches
- Low voltage control
- Maximum mast size 52mm
- Includes lower mast support

**CD4511** rotator

**\$704**

**Hy-Gain HAM IV - 1.4m<sup>2</sup>**

Heavy duty antennas, such as large tribanders and big HF monobanders need a heavy duty rotator, like the HAM-IV with its wedge brake.

- New high strength ring gear
- Dual 98 ball bearing race
- Electric locking steel wedge brake
- Illuminated directional indicator
- Zener regulated control circuit
- Snap action control switches
- Maximum mast size 52mm
- Lower mast support optional.

**HAM-IV** rotator

**\$997**

**Hy-Gain T'X Tailtwister - 1.9m<sup>2</sup>**

For multiple HF antenna arrays or HF+VHF arrays the T'X 'Tailtwister' has the grunt to handle the big jobs!

- Thickwall castings for large load handling
- 138 ball bearings
- Triple bearing race
- Machined hardened steel drive gear
- Electric locking steel wedge brake
- Low voltage control
- Maximum mast size 52mm
- Lower mast support optional

**T'X** Tailtwister rotator **\$1250**

Mast bearings, mast clamps, cable and parts all available, please call for details!

**Bench 1:1 balun**



harmonic radiation or causing TVI.

- UV resistant case
- Heavy brass terminals
- Plated copper lugs
- Custom 'O' ring on connector
- No rusting parts

**MT091** Bench 1:1 balun **\$66**

**Outdoor balun-in-a-box**

Use balanced line without the hassle of bringing it inside with the MFJ912 balun box. Works with most tuners to feed any balanced line so you can still use ladder line. Mounts on wall or tower.

**MFJ912**  
Outdoor balun

**\$99**

## RADIO WORKS baluns



A 1:1 current mode balun rated at 1.5kW for dipoles, inverted-V's and trapped dipoles. Use on 80-10 metres. Stainless steel fittings.

**MT113**  
B1-2K 1:1 balun **\$48**



A 4:1 current type balun with heavy duty 'X' core construction for loops, Delta loops, folded dipoles etc. on 16-10 metres. Our best 4:1 balun.

**MT111**  
B4-2K 4:1 balun **\$87**



An economy 4:1 voltage type balun for loops, Delta loops, folded dipoles etc. on 80-10 metres or for low impedance 160 metre applications.

**MT114**  
B4-2K 4:1 balun **\$67**



A high performance 1:1 balun for feeding open-wire line into the shack with coax. Withstands high SWR loads from antenna tuners.

**MT112**  
New Remote **\$105**



The 1:1 balun designed for feeding Yaesu. It has a 5kW power rating and excellent balance to help improve beam performance on 160-10M.

**MT095**  
Y1-5K 1:1 balun **\$67**

## ANTENNA WIRE & SUPPORT ROPE

**450Ω Open wire line**

This is a window type ladder-line. Conductors are #18 CopperWeld wire. It is perfect for use in any application requiring a low loss open wire line. Colour: Black only.

**MT3028**  
30mtr roll **\$36.00**

Get our wire antenna fact book  
for more information on wire  
antenna materials, including  
insulators.

**#14 Hard drawn Copper**

This is the standard antenna wire. Stranding is very tight, it is flexible, has a long service life, and is easy to use. For all wire antennas up to 150ft between supports.

**WL001X100**  
30mtr roll **\$26.60**  
**WL001X150**  
45mtr roll **\$39.93**

**#13 VARIFLEX insulated**  
Extremely tough jacket over a very flexible wire. About as stiff as hand-drawn 7-strand wire. Use when insulated wire is desired, in trees, for example. Resistant to acid rain and corrosive contaminants in the air.

**WL002X150**  
45mtr roll **\$78.65**

**Dacron rope**

4.7mm MilSpec rope. This is a very special Dacron® polyester line that far outlasts Nylon line in typical amateur service. It has an outer abrasion resistant cover that is impregnated with a special chemical that resists the aging effects caused by the sun. The center core is made of very strong solid braided Dacron®. The result is a long life support line that doesn't stretch. You cannot buy this type of support line at your friendly hardware store, so we keep a stock on hand in 30 meter & 60 metre hanks.

**WL004X100**  
30mtr hank **\$26.60**  
**WL004X200**  
60mtr hank **\$53.24**

# Kantronics packet solutions

## HostMaster-MAC

All the usual Macintosh interface features you would expect with all of the modes that a KAM+ can deliver. In fact HostMaster-MAC delivers more than many packet only programmes!

- ✓ Separate window for each connection with full split-screen functions.
- ✓ 10 buffers for EACH MODE.
- ✓ PACTOR support for KAM+ & enhanced KAM.
- ✓ Packet conferencing or round-table packet, even non-HostMaster users can join in.

**ML072** HostMaster-MAC

**\$95**

## SuperFax-II



Weather Facsimile (WEFAX) reception programme for Kantronics TNCs

- **Unattended:** automatically detects, synchronises & saves picture to disk.
- **Semi-unattended:** automatically detects start of picture, synchronises, receives picture to buffer.
- **Manual mode:** synchronise incoming picture with function keys; capture incoming picture to buffer, turn buffer on/off, or save directly to disk.
- View from buffer or disk file.
- Display black on white, or white on black.
- Print captured picture to Epson or compatible graphics printers & most 9 pin graphics printers.
- 120 lpm for weather or 60 lpm for wire photos.
- Split-screen terminal mode.
- Supports CGA, EGA, VGA & Hercules graphics.

Requires Kantronics KAM or KPC series using version 2.0 or later firmware.

**ML055** Superfax for IBM-PC

**\$45**

## KANTRONICS - Specialised Packet Solutions - KANTRONICS

### Kantronics Data Engine



The Kantronics Data Engine is built to keep pace with our changing times. For faster packet or experimentation and development, while remaining compatible with today's AX.25 system, a Data Engine is your answer.

You can install a second modem for dual port operation. Modem rates are available with data rates up to 19,200 baud. G8BPOQ Packet Switch firmware is also available.

- EPROM sockets for up to 1/2 MB of firmware
- V40 processor 10 MHz clock (PC compatible)
- Each port capable of >56 K baud, full or half duplex (depending on installed modems)
- Install modems internally, or externally via back panel connectors
- Low power: nominally 150 mA @ 12 VDC
- Size: 45 x 150 x 225mm, Weight: 1.2kg

**ML034** Data Engine only

**\$669**

**ML034A** DE with 1200bps modem

**\$792**

**ML034M3** Modem developer's kit

**\$45**

**ML034M4** Firmware developer's kit

**\$45**

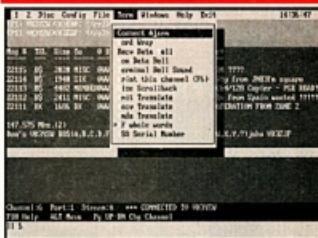
**ML036** DE 1200bps modem

**\$172**

**ML038** DE 9600/19.2 kbps modem

**\$212**

## HostMasterII+



The Host MasterII+ terminal programme provides a great way to carry on a packet conversation (or several conversations) monitor what else is happening on the channel while keeping everything separate. Plus, with the KAM, work any HF mode at the same time.

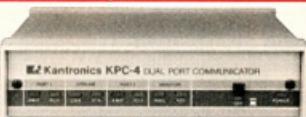
The XmitEcho window shows characters as they are transmitted by an HF mode. What you receive from a mode other than packet, such as RTTY, ASCII, AMTOR or Pactor, displays in the Non-Packet Receive Window.

- ✓ Menu driven from keyboard or mouse.
- ✓ 10 buffers, each sent with single keystroke.
- ✓ PACTOR support for KAM+ & enhanced KAM.
- ✓ Replay last line typed on each channel.
- ✓ Scroll back in Monitor and Receive windows.
- ✓ Supports up to 50 line VGA video.
- ✓ Upload and Download Binary or ASCII files. Each window can capture to its own separate file.
- ✓ Edit and save Receive Scrollback buffers.
- ✓ Character Translations supported separately for transmit and receive.
- ✓ Supports mouse, printer, COM ports 1-4
- ✓ Text Editor, with cut and paste capability

**ML060** HostMasterII+ for IBM-PC

**\$110**

### KPC-4 Dual-port Packet Controller



The KPC-4 is a Packet Communicator with two radio ports and two modems. You can operate from both ports at the same time, and if desired provide a gateway between them.

Most commands have dual-port settings allowing you to adjust each port to the characteristics of the attached radio and operating conditions.

- **Software Carrier Detect** — you can run open squelch and detect weaker signals.
- **Personal Packet Mailbox [PPBS] features:** programmable size, reverse forwarding, TO field editing, mail-waiting indicator.
- Automatically transfer connects to PPBS.
- Host Mode for HOSTMASTER software
- Weather Facsimile reception with optional programme
- Full duplex capability.
- KISS mode for TCP/IP or BBS use.
- Baud rates: 1200, 600, 400, 300.
- 32K RAM.
- Supports up to 26 packet connections (streams).
- Size: 45 x 150 x 200mm, 1.2kg
- Requires 12 VDC at < 250 mA
- Optional SmartWatch — Stores PPBS messages, and keeps date and time when unit is turned off.

**ML032** KPC-4 dual port packet TNC

**\$599**

## Give your KAM 128K RAM, Pactor and now G-TOR!

The KAM Enhancement Board provides KAM owners with the same features as the new KAM Plus. The Enhancement Board fits easily within the KAM case, plugging into the EPROM and RAM sockets. Many optional features for the KAM are now standard in the Enhancement Board:

- G-Tor & Pactor
- on-board real-time clock
- battery-backed RAM

New hardware and firmware features have been added, most significantly, the expansion of RAM and EPROM space to 128K bytes. The enlarged RAM creates about 100K of personal mailbox space! The increased EPROM space makes possible additional firmware features and provides room for future expansion.

### New hardware features:

- 128K bytes of RAM
- EPROM space expanded to 1 Megabits
- Replaceable lithium cell for clock & RAM backup

### New firmware additions:

- New-user and expert command sets
- Enhanced mailbox command set
- Extended RTTY & AMTOR character sets
- On-line help messages for each command
- Enhanced CW: Farnsworth, weighting, tone transmitted CW

**ML030D** KAM enhancement board

**\$160**

## Update your KAM+

Gee, it is out of date already? No, not really, the folks at Kantronics just like making it better and better! Any KAM-Plus (or KAM with enhancement board) can be updated to include the latest HF mode, G-Tor, and all of the latest enhancements to the ever-popular Kantronics multi-mode controllers.

## Update HostMasterII+

HostMasterII+ owners with version 3.0 or later can upgrade to version 3.3, the latest edition with full support for G-Tor and Pactor.

### Kantronics WeatherNode



The Kantronics WeatherNode collects data from attached sensors and stores it in battery-backed RAM, which can then be accessed via packet radio or telephone modem. To request information from the WeatherNode, you simply connect, and request information with the Data command.

The WeatherNode connects to the serial port of your TNC, and may also be connected to your computer serial port. Front panel switches allow three modes of operation, local, remote or bypass. The Bypass mode bypasses the WeatherNode completely and allows you to use your TNC normally.

- External & internal temperature sensors supplied.
- Temperature readings in °F or °C.
- Data command retrieves only the information you want.
- Password protected remote access.
- Connects to any TNC.
- RS-232 or TTL levels selected by internal jumper.
- Accepts up to seven sensors.
- Size: 45 x 152 x 203mm, 1kg.
- Power Requirements: 12 - 20 VDC, <45 mA

**ML043A** WeatherNode

**\$642-00**

**ML043S3** Anemometer

**\$244-00**

**ML043S2** Rain gauge

**\$190-00**

# multi-mode mastery – Kantronics

- ★ Dual Ports
- ★ HF & VHF Packet
- ★ AMTOR Modes A & B
- ★ AMTEX / NAVTEX
- ★ RTTY (Baudot & ASCII)
- ★ CW (5-99 WPM)
- ★ Sophisticated PBBS
- ★ Can use different modes on VHF and HF simultaneously!

**\$729** Stock No.  
ML030E  
Freight \$15

## Two Radio Ports, Two Modems

The KAM+ has two radio ports, one especially for HF modes and one for VHF packet. Both ports can be used simultaneously, allowing you to operate packet from both ports at the same time, or provide a packet gateway between the two ports. If you are using the HF port for a mode other than packet, your VHF port can still be operational with your packet mailbox, digipeater, and KA-Node functions. If you are using a Host Mode terminal programme, you can simultaneously work VHF packet and any HF mode. Amtor & Pactor users have access to the same mailbox as VHF packet users.

### Modes

The VHF port is used for 1200 baud packet, and reception of weather facsimile (WEFAX) when used with an HF radio.

The HF port supports 50 to 300 baud packet; 20 to 500 baud RTTY(ASCII); Amtor Mode A (ARQ) and Mode B (FEC or SELFEC); G-Tor, Pactor, Navtex, Amtex message formats; preprogrammed 170, 425 and 850 Hz shifts, plus user definable mark and space tones; as well as 5 - 99 words per minute CW with Farnsworth mode.

## Kantronics KPC-3



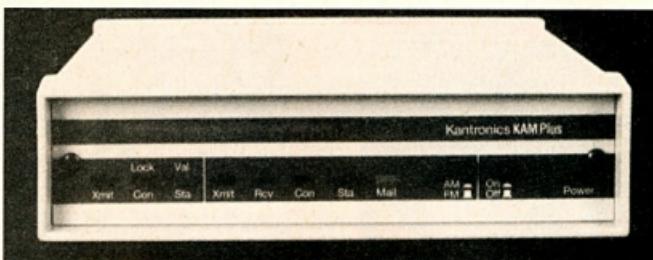
The high performance, low power, small sized TNC. This TNC for both new and experienced users features a dual-level command set with 23 and 1380 commands respectively and incorporates the Kantronics full-feature PBBS system.

The KPC-3 and KPC-9612 are Kantronics answers to the high costs, high power consumption and lack of features of some manufacturers. These packet controllers are suitable for portable and emergency operation as well as having all of the features you need for home operation.

- ★ New user mode for simple operation and set-up.
- ★ Two comprehensive and easy to read manuals make installation and operation truly easy.
- ★ Has HOST MODE for HostMaster software.
- ★ Complete with KISS mode, KA-NODE and WeFax, just like all the "big" TNCs!
- ★ PBBS works just like WORLD BBS system!

**ML073** KPC-3 packet controller      **\$279**

**ML073B** Real-time clock option kit      **\$35**



The KAM+ also supports a personal packet mailbox accessible from both ports and from Amtor as well as Packet modes. KISS mode for high level protocols such as TCP/IP works in multi-drop mode. Host mode for enhanced terminal programmes. KA-Node (similar to Net/Rom) for links which are more reliable than digipeating. You can also set up a Gateway or KA-Node between the two ports.

- ★ Software Carrier Detect – run open squelch and detect weaker signals.
- ★ Full duplex capability on VHF port
- ★ Large bargraph tuning indicator for easy HF tuning.
- ★ AMTOR – provides for 7 or 9 char SELCALS, relinking, and compatibility with 4 char operation.
- ★ CW – Selectable bandwidth and centre frequency
- ★ NAVTEX / AMTEX – Using AMTEX mode you can copy ARRL bulletins.
- ★ RTTY / ASCII – User definable mark & space tones.

- ★ Personal Packet and Amtor/Pactor/G-Tor Mailbox (PBBS) features: programmable size now up to 500K bytes, reverse forwarding, TO field editing, mail-waiting indicator
- ★ Automatically transfer connects to PBBS
- ★ Host Mode support for simultaneous VHF mode and any HF mode
- ★ Weather Facsimile (WEFAX) reception with optional programme.

- ★ Battery-backed RAM and Clock built-in.
- ★ 128K RAM with option to 512K.
- ★ Reliable, fast acting AGC eliminates the need for a manual threshold adjustment
- ★ Size: 45 x 150 x 225mm, 1.2kg
- ★ Requires 12 VDC at < 300 mA

### Options

- ★ Terminal and Wefax programmes for PC compatibles, Macintosh and Commodore C64/128.
- ★ Host Master terminal programmes provide capability to simultaneously work VHF packet and any HF mode (for PC, C64 or Macintosh).

## Kantronics KPC-9612



Full dual port performance at both 9600 baud and 1200 baud with cross-port gateway and digipeating, enough to make the competition weep! The KPC-9612 has all of the features of the KPC-3 and a whole lot more!

The KPC-9612 combines the features of the KPC-3 with a new 9600 baud modem designed for ease of setup and low power operation.

With the KPC-9612 Kantronics have also added several control lines in each port so that you can control relays or radios with ease from your packet software. Fully remotely controllable with password protection. Supplied as standard with 32K of RAM.

### KPC-9612 specific features:

- ★ Easily adjusted output levels.
- ★ Simple to adjust equaliser.
- ★ Cross port gateway.
- ★ Dual port mailbox
- ★ Cross port digipeating
- ★ Ideal for PACSAT operation at 9600 baud.
- ★ Multi-drop KISS for ease of use with NOS.

**ML074** KPC-9612 packet controller      **\$535**

## Savant!

software for the Macintosh  
will work with all  
Kantronics, DRSI, MFJ or  
other packet equipment  
having KISS mode!



### Savant packet software (Macintosh)

- ★ Animated icons show channel status
- ★ Split window interface
- ★ Status bar shows channel information
- ★ Open as many concurrent connections as you want
- ★ System 7 compatible, 32 bit clean
- ★ Works with any KISS capable TNC

**BX468**

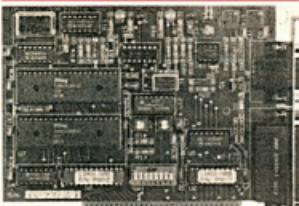
Savant software

**\$79**

Savant software for the Macintosh is the best we have found for packet work. A simple and intuitive to use programme. Savant has all the features you could want. Works with AEA, DRSI, PacComm, MFJ or Kantronics TNCs in KISS mode.

# DRSI

PC\*Packet adaptors



Enjoy packet without the need for TNCs cluttering up the place! The DRSI PC\*Packet Adaptor is the ideal way to get on packet without losing COM ports on your computer, especially if you are running a BBS or network system. All DRSI PC\*Packet Adaptors have two separate output ports allowing them to use one or two radios. The three types differ in the configuration of the modems on the card and those supported externally.

#### PC\*Packet Adaptor Type 1.

The basic type with one on-board 1200 bps AFSK modem for VHF/UHF use and provision for one external modem. The second port can be connected to an HF modem or a high speed modem. Optional DCD card can be fitted.

**ML004** DRSI type 1 card \$299

#### PC\*Packet Adaptor Type 2.

The Type 2 adaptor has two 1200 bps modems for BBS and more sophisticated applications. Both ports may have DCD cards fitted.

**ML005** DRSI type 2 card \$363

#### HF Modem

For use with type 1 cards, the DRSI HF modem offers superior performance. Power is derived from the PC\*Packet Adaptor but the modem can be placed with the HF radio for ease of tuning and use.

**ML009** HF modem \$171

## DRSI Packet TNCs

The DRSI DPK-2 redefines the state-of-the-art in TAPR TNC-2 compatible packet controllers. It is a compact, low power, ALL CMOS design with 100% TNC-2 firmware compatibility and runs ROSE & NET/ROM. It comes with version 1.1a TAPR firmware, enhanced with the DRSI Personal Message System (PMS).



**ML006**  
DRSI DPK-2 TNC

\$279

#### Low cost 9600bps at last!

The DRSI DPK-9600 takes the technology of high speed packet one step closer to the 'plug and play' goal we have all been waiting for. For the first time assembling a 9600bps system can be almost as simple as getting a 1200bps system on air.



**DPK-9600**

The DRSI DPK-9600 is the ideal TNC for high speed packet radio. A single chip FSK modem is combined with a custom programmable logic device to produce a TNC which is 100% compatible with the G3RUH and K9NG modem designs.

Modem is jumper selectable for 4800, 9600 and 19,200bps speeds with serial port speeds of up to 38.4kbps. Uses any TAPR TNC-2 compatible firmware without modification.

★ TNC-2 compatible high speed TNC  
★ Jumper-selectable speeds  
★ Runs ROSE & NET/ROM firmware  
★ Includes paKit 5.1 software  
★ Personal Message System  
★ Battery-backed RAM  
★ Power required <40mA @ 12VDC  
★ Radio modification details supplied  
★ Quality American made

**ML010**  
DRSI DPK-9600 TNC

\$459

## Faster Packet!



#### High speed options and TNCs

All MFJ controllers are available with the 2400 baud modem fitted for easy operation of 300, 1200 & 2400 bps packet. You can order the controller factory modified with the TURBO option fitted by using the following model numbers:

**MFJ1278BT** 2400 bps MFJ1278B

**\$799**

**MFJ1270TC** 2400 bps MFJ1270C

**\$429**

**MFJ1276T** 2400 bps MFJ1276

**\$519**

Any MFJ TNC, and most types from other manufacturers which have a standard modem disconnect header, can be fitted with the MFJ2400 2400 bps QPSK modem.

**MFJ2400** 2400bps for MFJ TNCs

**\$200**

**MFJ2400X** 2400bps for PK-232

**\$200**

**MFJ9600** 9600bps modem card

**\$245**

You can also order any MFJ TNC with a 9600 baud modem fitted.

**MFJ1278BQ** 9600 bps MFJ1278B

**\$829**

**MFJ1270CQ** 9600 bps MFJ1270C

**\$459**

**MFJ1276Q** 9600 bps MFJ1276C

**\$549**

Note: Not all radios are compatible with 9600 baud operation.

DAYCOM, Australia's leading packet supplier, can fit you out with the best in high speed packet and memory expansion options.

Our showroom has all of the latest packet equipment on display, just waiting for you to try it on air, whilst our workshop is uniquely equipped to sort out your interconnection and set-up problems. If you need assistance, just call!

#### Upgrade your existing MFJ1278!

If you already have an MFJ1278B or MFJ1278T you can upgrade your existing multi-mode controller to have most of the features of the MFJ1278B. You will get PACTOR, enhanced mailbox and with the latest Multicom upgrade you get all of the colour SSTV features and ease of use of the new MFJ1278B.

**MFJ56A** upgrade with 32k RAM

**\$160**

**MFJ56B** upgrade with 128k RAM

**\$200**

**MFJ56C** upgrade with 512k RAM

**\$500**

#### Memory Expansion

For expanding MFJ1278B, MFJ1270C, MFJ1276, KPC-3 or KAM+ controllers order these kits:

**MFJ45A** 32k RAM chip kit

**\$16**

**MFJ45B** 128k RAM chip kit

**\$30**

**MFJ45C** 512k RAM chip kit

**\$400**

## Packet Connecting cables

Radio Type	TNC Type				
	MFJ DRSI Paccom	AEA PK232	AEA PK88	Kantronics HF	Kantronics VHF
Icom/Yaesu Handheld	MFJ5024	MFJ5024X	MFJ5024Z		MFJ5024Y
Kenwood Handheld	MFJ5026	MFJ5026X	MFJ5026Z		MFJ5026Y
Yaesu 8 pin radios	MFJ5080	MFJ5080X	MFJ5080Z	MFJ5080YY	MFJ5080YY
Icom 8 pin radios	MFJ5084	MFJ5084X	MFJ5084Z	MFJ5084YY	MFJ5084YY
Kenwood/Airco 8 pin radios	MFJ5086	MFJ5086X	MFJ5086Z	MFJ5086YY	MFJ5086YY

**MFJ packet cables** all types listed above

**\$37.50**

#### MIC/TNC SWITCH



**MFJ1272B** for MFJ/DRSI TNCs

**\$87.00**

**MFJ1272BX** for AEA PK-232

**\$99.00**

**MFJ1272BYH** for KAM HF port

**\$99.00**

**MFJ1272BVY** for Kantronics VHF port

**\$99.00**

**MFJ1272BZ** for AEA PK-88

**\$99.00**

**MFJ1272TM** for MFJ/DRSI TNC to RJ45

**\$87.00**

**MFJ1272MX** for AEA PK-232 to RJ45

**\$99.00**

**MFJ1272MYV** for Kantronics VHF port

**\$99.00**

**MFJ1272MZ** for AEA PK-88

**\$99.00**

Make life even easier, use the MFJ1272B Microphone / TNC switch with any radio using a standard 8 pin microphone plug. Suits ICOM, Kenwood, Yaesu & others.

Internal jumpers permit custom configuration of connections, speaker input and output available for older radios.

**MFJ1278B & Multicom  
give you FAX, SSTV and  
WEFAX too!**



Selected: PACTOR MODE SELECT / FUNCTION BUFFER  
PT-PACKET PT-AMPTER PT-BYTTI PT-4K117 PT-CW  
PT-AMPTER PT-BYTTI PT-4K117 PT-CW  
PT-BYTTI PT-4K117 PT-CW

FUNCTION BUFFERS CONTENTS

- 1 "C" mode PTY (changes to packet mode at 100 baud)
- 2 "C" mode (changes to packet mode at 200 baud)
- 3 "C" mode (changes to packet mode at 400 baud)
- 4 "C" mode (changes to packet mode at 800 baud)
- 5 "C" mode (changes to packet mode at 1600 baud)
- 6 "C" mode (changes to packet mode at 3200 baud)
- 7 "C" mode (changes to packet mode at 6400 baud)
- 8 "C" mode (changes to packet mode at 12800 baud)
- 9 "C" mode (changes to packet mode at 25600 baud)
- 10 "C" mode (changes to packet mode at 51200 baud)
- 11 "C" mode (changes to packet mode at 102400 baud)
- 12 "C" mode (changes to packet mode at 204800 baud)
- 13 "C" mode (changes to packet mode at 409600 baud)
- 14 "C" mode (changes to packet mode at 819200 baud)
- 15 "C" mode (changes to packet mode at 1638400 baud)
- 16 "C" mode (changes to packet mode at 3276800 baud)
- 17 "C" mode (changes to packet mode at 6553600 baud)
- 18 "C" mode (changes to packet mode at 13107200 baud)
- 19 "C" mode (changes to packet mode at 26214400 baud)
- 20 "C" mode (changes to packet mode at 52428800 baud)
- 21 "C" mode (changes to packet mode at 104857600 baud)
- 22 "C" mode (changes to packet mode at 209715200 baud)
- 23 "C" mode (changes to packet mode at 419430400 baud)
- 24 "C" mode (changes to packet mode at 838860800 baud)
- 25 "C" mode (changes to packet mode at 1677721600 baud)
- 26 "C" mode (changes to packet mode at 3355443200 baud)
- 27 "C" mode (changes to packet mode at 6710886400 baud)
- 28 "C" mode (changes to packet mode at 13421772800 baud)
- 29 "C" mode (changes to packet mode at 26843545600 baud)
- 30 "C" mode (changes to packet mode at 53687091200 baud)
- 31 "C" mode (changes to packet mode at 107374182400 baud)
- 32 "C" mode (changes to packet mode at 214748364800 baud)
- 33 "C" mode (changes to packet mode at 429496729600 baud)
- 34 "C" mode (changes to packet mode at 858993459200 baud)
- 35 "C" mode (changes to packet mode at 1717986918400 baud)
- 36 "C" mode (changes to packet mode at 3435973836800 baud)
- 37 "C" mode (changes to packet mode at 6871947673600 baud)
- 38 "C" mode (changes to packet mode at 13743895347200 baud)
- 39 "C" mode (changes to packet mode at 27487790694400 baud)
- 40 "C" mode (changes to packet mode at 54975581388800 baud)
- 41 "C" mode (changes to packet mode at 109951162777600 baud)
- 42 "C" mode (changes to packet mode at 219902325555200 baud)
- 43 "C" mode (changes to packet mode at 439804651110400 baud)
- 44 "C" mode (changes to packet mode at 879609302220800 baud)
- 45 "C" mode (changes to packet mode at 1759218604441600 baud)
- 46 "C" mode (changes to packet mode at 3518437208883200 baud)
- 47 "C" mode (changes to packet mode at 7036874417766400 baud)
- 48 "C" mode (changes to packet mode at 14073748835532800 baud)
- 49 "C" mode (changes to packet mode at 28147497671065600 baud)
- 50 "C" mode (changes to packet mode at 56294995342131200 baud)
- 51 "C" mode (changes to packet mode at 11258999068426400 baud)
- 52 "C" mode (changes to packet mode at 22517998136852800 baud)
- 53 "C" mode (changes to packet mode at 45035996273705600 baud)
- 54 "C" mode (changes to packet mode at 90071992547411200 baud)
- 55 "C" mode (changes to packet mode at 180143985094822400 baud)
- 56 "C" mode (changes to packet mode at 360287970189644800 baud)
- 57 "C" mode (changes to packet mode at 720575940379289600 baud)
- 58 "C" mode (changes to packet mode at 1441151880758579200 baud)
- 59 "C" mode (changes to packet mode at 2882303761517158400 baud)
- 60 "C" mode (changes to packet mode at 5764607523034316800 baud)
- 61 "C" mode (changes to packet mode at 1152921504606863200 baud)
- 62 "C" mode (changes to packet mode at 2305843009213726400 baud)
- 63 "C" mode (changes to packet mode at 4611686018427452800 baud)
- 64 "C" mode (changes to packet mode at 9223372036854905600 baud)
- 65 "C" mode (changes to packet mode at 18446744073709811200 baud)
- 66 "C" mode (changes to packet mode at 36893488147419622400 baud)
- 67 "C" mode (changes to packet mode at 73786976294839244800 baud)
- 68 "C" mode (changes to packet mode at 147573952589678489600 baud)
- 69 "C" mode (changes to packet mode at 295147905179356979200 baud)
- 70 "C" mode (changes to packet mode at 590295810358713958400 baud)
- 71 "C" mode (changes to packet mode at 1180591620717427916800 baud)
- 72 "C" mode (changes to packet mode at 2361183241434855833600 baud)
- 73 "C" mode (changes to packet mode at 4722366482869711667200 baud)
- 74 "C" mode (changes to packet mode at 9444732965739423334400 baud)
- 75 "C" mode (changes to packet mode at 18889465931478846668800 baud)
- 76 "C" mode (changes to packet mode at 37778931862957693337600 baud)
- 77 "C" mode (changes to packet mode at 75557863725915386675200 baud)
- 78 "C" mode (changes to packet mode at 15111572745823077350400 baud)
- 79 "C" mode (changes to packet mode at 30223145491646154700800 baud)
- 80 "C" mode (changes to packet mode at 60446290983292309401600 baud)
- 81 "C" mode (changes to packet mode at 120892581966584618803200 baud)
- 82 "C" mode (changes to packet mode at 241785163933169237606400 baud)
- 83 "C" mode (changes to packet mode at 483570327866338475212800 baud)
- 84 "C" mode (changes to packet mode at 967140655732676950425600 baud)
- 85 "C" mode (changes to packet mode at 1934281311465353900851200 baud)
- 86 "C" mode (changes to packet mode at 3868562622930707801602400 baud)
- 87 "C" mode (changes to packet mode at 7737125245861415603204800 baud)
- 88 "C" mode (changes to packet mode at 15474250491722831206409600 baud)
- 89 "C" mode (changes to packet mode at 30948500983445662412819200 baud)
- 90 "C" mode (changes to packet mode at 61897001966891324825638400 baud)
- 91 "C" mode (changes to packet mode at 123794003933782656511276800 baud)
- 92 "C" mode (changes to packet mode at 247588007867565313022553600 baud)
- 93 "C" mode (changes to packet mode at 495176015735130626045107200 baud)
- 94 "C" mode (changes to packet mode at 990352031470261252085214400 baud)
- 95 "C" mode (changes to packet mode at 1980704062940522504160428800 baud)
- 96 "C" mode (changes to packet mode at 3961408125881045008320857600 baud)
- 97 "C" mode (changes to packet mode at 7922816251762090016641715200 baud)
- 98 "C" mode (changes to packet mode at 15845632535240180032323430400 baud)
- 99 "C" mode (changes to packet mode at 31691265070480360064646860800 baud)
- 100 "C" mode (changes to packet mode at 63382530140960720012929721600 baud)
- 101 "C" mode (changes to packet mode at 126765060281921440025859443200 baud)
- 102 "C" mode (changes to packet mode at 253530120563842880051718886400 baud)
- 103 "C" mode (changes to packet mode at 507060241127685760103477772800 baud)
- 104 "C" mode (changes to packet mode at 1014120482255375522069555445600 baud)
- 105 "C" mode (changes to packet mode at 2028240964510751044139110891200 baud)
- 106 "C" mode (changes to packet mode at 4056481929021502088278221782400 baud)
- 107 "C" mode (changes to packet mode at 8112963858043004176556443564800 baud)
- 108 "C" mode (changes to packet mode at 16225927716086008353112887129600 baud)
- 109 "C" mode (changes to packet mode at 32451855432172016706225774259200 baud)
- 110 "C" mode (changes to packet mode at 64903710864344033412451548518400 baud)
- 111 "C" mode (changes to packet mode at 129807421728688066824930977036800 baud)
- 112 "C" mode (changes to packet mode at 259614843457376133649861954073600 baud)
- 113 "C" mode (changes to packet mode at 519229686914752267299723858147200 baud)
- 114 "C" mode (changes to packet mode at 1038459373829504534599447716294400 baud)
- 115 "C" mode (changes to packet mode at 2076918747659009069198895432588800 baud)
- 116 "C" mode (changes to packet mode at 4153837495318018138397790865177600 baud)
- 117 "C" mode (changes to packet mode at 8307674990636036276795581730355200 baud)
- 118 "C" mode (changes to packet mode at 16615349981272072533591163460710400 baud)
- 119 "C" mode (changes to packet mode at 33230699962544145067182326921420800 baud)
- 120 "C" mode (changes to packet mode at 66461399925088290134364653842841600 baud)
- 121 "C" mode (changes to packet mode at 132922799851775880268729307685683200 baud)
- 122 "C" mode (changes to packet mode at 265845599703551760537458615371366400 baud)
- 123 "C" mode (changes to packet mode at 531691199407103520114917230742732800 baud)
- 124 "C" mode (changes to packet mode at 1063382398142067602229344601485465600 baud)
- 125 "C" mode (changes to packet mode at 2126764796284135204458689202970931200 baud)
- 126 "C" mode (changes to packet mode at 4253529592568270408917378405941862400 baud)
- 127 "C" mode (changes to packet mode at 8507059185136540817834756811883724800 baud)
- 128 "C" mode (changes to packet mode at 1701411837027308163566913363777449600 baud)
- 129 "C" mode (changes to packet mode at 340282367405461632713382672755499200 baud)
- 130 "C" mode (changes to packet mode at 68056473481092326542676534551099200 baud)
- 131 "C" mode (changes to packet mode at 136112946962184653085353069102198400 baud)
- 132 "C" mode (changes to packet mode at 272225893924369306170706138204396800 baud)
- 133 "C" mode (changes to packet mode at 544451787848738612341412276408793600 baud)
- 134 "C" mode (changes to packet mode at 1088903575695477224682824552817587200 baud)
- 135 "C" mode (changes to packet mode at 2177807151390954449365649105635174400 baud)
- 136 "C" mode (changes to packet mode at 4355614302781908898731298211270348800 baud)
- 137 "C" mode (changes to packet mode at 8711228605563817797462596422540676800 baud)
- 138 "C" mode (changes to packet mode at 17422457211127535594925928445081353600 baud)
- 139 "C" mode (changes to packet mode at 3484491442225507118985185689016267200 baud)
- 140 "C" mode (changes to packet mode at 6968982884451014237970371378032534400 baud)
- 141 "C" mode (changes to packet mode at 13937965768902028475940746556065068800 baud)
- 142 "C" mode (changes to packet mode at 27875931537804056951881493112130137600 baud)
- 143 "C" mode (changes to packet mode at 55751863075608113903762986224260275200 baud)
- 144 "C" mode (changes to packet mode at 111503726151216227807529732448520550400 baud)
- 145 "C" mode (changes to packet mode at 223007452302432455615059464896101100800 baud)
- 146 "C" mode (changes to packet mode at 446014904604864911230018892972202201600 baud)
- 147 "C" mode (changes to packet mode at 892029809209729822460037785944404403200 baud)
- 148 "C" mode (changes to packet mode at 1784059618419458448120755718888088806400 baud)
- 149 "C" mode (changes to packet mode at 356811923683891689624151143777617761600 baud)
- 150 "C" mode (changes to packet mode at 71362384736778337924830228755523553200 baud)
- 151 "C" mode (changes to packet mode at 14272476947355667584966045751106706400 baud)
- 152 "C" mode (changes to packet mode at 28544953894711335169932091150221412800 baud)
- 153 "C" mode (changes to packet mode at 57089857789422670339864182300442825600 baud)
- 154 "C" mode (changes to packet mode at 114179715578845340679328364600885651200 baud)
- 155 "C" mode (changes to packet mode at 228359431157690681358656729201771302400 baud)
- 156 "C" mode (changes to packet mode at 456718862315381362717313458403542604800 baud)
- 157 "C" mode (changes to packet mode at 913437724630762725434626916807085209600 baud)
- 158 "C" mode (changes to packet mode at 1826875449261525450869253833614170419200 baud)
- 159 "C" mode (changes to packet mode at 3653750898523050901738507667228340838400 baud)
- 160 "C" mode (changes to packet mode at 7307501797046101803477015334456681676800 baud)
- 161 "C" mode (changes to packet mode at 14615003594832203606944030668913333353600 baud)
- 162 "C" mode (changes to packet mode at 29230007189664407213888061337826666707200 baud)
- 163 "C" mode (changes to packet mode at 58460014379328814427776012675653333414400 baud)
- 164 "C" mode (changes to packet mode at 11692002878656162845552025335130666828800 baud)
- 165 "C" mode (changes to packet mode at 23384005757312325681104050670261333657600 baud)
- 166 "C" mode (changes to packet mode at 46768001125656651362208025340522667315200 baud)
- 167 "C" mode (changes to packet mode at 93536002251313302724416050681044534630400 baud)
- 168 "C" mode (changes to packet mode at 18707200450262660544883205136208906860800 baud)
- 169 "C" mode (changes to packet mode at 37414400900525321089766405272417813721600 baud)
- 170 "C" mode (changes to packet mode at 74828801801050642179532805544835627443200 baud)
- 171 "C" mode (changes to packet mode at 149657603602101284359065605189671254886400 baud)
- 172 "C" mode (changes to packet mode at 299315207204202568718131205379342509772800 baud)
- 173 "C" mode (changes to packet mode at 598630414408405137436262405758685019545600 baud)
- 174 "C" mode (changes to packet mode at 119726082881680274873244805507737039091200 baud)
- 175 "C" mode (changes to packet mode at 239452165763360549746489605001574078182400 baud)
- 176 "C" mode (changes to packet mode at 478904321526721099492979205003148156364800 baud)
- 177 "C" mode (changes to packet mode at 957808643053442198985958405006296312729600 baud)
- 178 "C" mode (changes to packet mode at 1915617286106844397971916805012592625459200 baud)
- 179 "C" mode (changes to packet mode at 3831234572213688795943833605025185250918400 baud)
- 180 "C" mode (changes to packet mode at 7662469144427377591887667205050370501836800 baud)
- 181 "C" mode (changes to packet mode at 15324938288854755183775344050100740036773600 baud)
- 182 "C" mode (changes to packet mode at 30649876577709510367550688050201480073547200 baud)
- 183 "C" mode (changes to packet mode at 61299753155419020735101376050402800147094400 baud)
- 184 "C" mode (changes to packet mode at 12259950630883804147020275205080560029418800 baud)
- 185 "C" mode (changes to packet mode at 24519901261767608294040550405161120058837600 baud)
- 186 "C" mode (changes to packet mode at 49039802523535216588081100805322400117675200 baud)
- 187 "C" mode (changes to packet mode at 98079605047070433176162201605644800235350400 baud)
- 188 "C" mode (changes to packet mode at 196159210094140866352324403205129600470700800 baud)
- 189 "C" mode (changes to packet mode at 392318420188281732704648806405259200941401600 baud)
- 190 "C" mode (changes to packet mode at 784636840376563465409297612805518401882803200 baud)
- 191 "C" mode (changes to packet mode at 1569273680731126930818552256051036803765606400 baud)
- 192 "C" mode (changes to packet mode at 3138547361462253861637104512052073607531212800 baud)
- 193 "C" mode (changes to packet mode at 6277094722924507723274209024054147215062425600 baud)
- 194 "C" mode (changes to packet mode at 1255418944584901546554401848058294430012851200 baud)
- 195 "C" mode (changes to packet mode at 251083788916980309310880369605658886025602400 baud)
- 196 "C" mode (changes to packet mode at 50216757783396061862176073920531777240512800 baud)
- 197 "C" mode (changes to packet mode at 10043351556679212324435204784056355488025600 baud)
- 198 "C" mode (changes to packet mode at 20086703113358424648870409568052711076051200 baud)
- 199 "C" mode (changes to packet mode at 40173406226716849297740819136055422152102400 baud)
- 200 "C" mode (changes to packet mode at 80346812453433698595581638272050844304204800 baud)
- 201 "C" mode (changes to packet mode at 160693624906673977191163276544001688809609600 baud)
- 202 "C" mode (changes to packet mode at 321387249813347954382326553088003377619219200 baud)
- 203 "C" mode (changes to packet mode at 642774499626695908764653106176006755238438400 baud)
- 204 "C" mode (changes to packet mode at 1285548999253391817529306212352001351117686400 baud)
- 205 "C" mode (changes to packet mode at 2571097998506783635058612426704002702235372800 baud)
- 206 "C" mode (changes to packet mode at 5142195997013567270117224853408005404467545600 baud)
- 207 "C" mode (changes to packet mode at 10284391994027134540234449706816001080893508800 baud)
- 208 "C" mode (changes to packet mode at 20568783988054269080468899413632002161787177600 baud)
- 209 "C" mode (changes to packet mode at 4113756797610853816093779882726400432357555200 baud)
- 210 "C" mode (changes to packet mode at 822751359522170763218755976545280086471510400 baud)
- 211 "C" mode (changes to packet mode at 164550271904434152643711953309056017294208800 baud)
- 212 "C" mode (changes to packet mode at 329100543808868305287423906618112034588417600 baud)
- 213 "C" mode (changes to packet mode at 658201087617736610574847813236224069176835200 baud)
- 214 "C" mode (changes to packet mode at 131640217323487322148169562647248013835350400 baud)
- 215 "C" mode (changes to packet mode at 263280434646974644296339125294496027670700800 baud)
- 216 "C" mode (changes to packet mode at 526560869293949288592678250588992055341401600 baud)
- 217 "C" mode (changes to packet mode at 1053121738587898577845356501177984110682803200 baud)
- 218 "C" mode (changes to packet mode at 2106243477175797155690713002355968221365606400 baud)
- 219 "C" mode (changes to packet mode at 4212486954351594311381426004671936442731212800 baud)
- 220 "C" mode (changes to packet mode at 842497390870318862276285200934387285452425600 baud)
- 221 "C" mode (changes to packet mode at 168499478174063772455257400186877457090491200 baud)
- 222 "C" mode (changes to packet mode at 336998956348127544910514800373754914180982400 baud)
- 223 "C" mode (changes to packet mode at 673997912696255089821029600747509382609764800 baud)
- 224 "C" mode (changes to packet mode at 1347995825392510177642058001495054765219529600 baud)
- 225 "C" mode (changes to packet mode at 269599165078502035528411600299010953043859200 baud)
- 226 "C" mode (changes to packet mode at 539198320157004071056823200598021906087718400 baud)
- 227 "C" mode (changes to packet mode at 1078396640340080142136464001196043812175436800 baud)
- 228 "C" mode (changes to packet mode at 2156793280680160284272928002392087624350873600 baud)
- 229 "C" mode (changes to packet mode at 4313586561360320568545856004784175248701747200 baud)
- 230 "C" mode (changes to packet mode at 8627173122720640137091712009563504974034954400 baud)
- 231 "C" mode (changes to packet mode at 1725434624544128027418344001912670994806988800 baud)
- 232 "C" mode (changes to packet mode at 3450869249088256054836688003825341989613977600 baud)
- 233 "C" mode (changes to packet mode at 6901738498176512019673376007650683978277555200 baud)
- 234 "C" mode (changes to packet mode at 1380347697635304039346752001530136795655110400 baud)
- 235 "C" mode (changes to packet mode at 2760695395270608078693504003060273585310220800 baud)
- 236 "C" mode (changes to packet mode at 5521390790541216015398008006120547170620441600 baud)
- 237 "C" mode (changes to packet mode at 11042781581084320307960160012241494341240883200 baud)
- 238 "C" mode (changes to packet mode at 22085563162168640615920320024482988682481766400 baud)
- 239 "C" mode (changes to packet mode at 44171126324337280123840640048965977364963532800 baud)
- 240 "C" mode (changes to packet mode at 88342252648674560247681280097931954729927065600 baud)
- 2

# MFJ Deluxe hybrid phone patch



## MFJ624D

Deluxe hybrid phone-patch

**\$225**

## CLOCKS

### MFJ112 - World time clock

Not only shows you the time at any QTH throughout the world, it also gives you an attractive world map so you can see the place where your contact is! Displays hours, minutes, seconds, user selectable daylight saving time feature, push buttons allow you to move east or west and a flashing map segment shows the time zone. Great gift idea!



### MFJ112 DXers World Clock

**\$62.50**

### MFJ105 24 hour wall clock

Powered by a single 'AA' size battery the MFJ105B is a true 24 hour wall clock with a 250mm diameter face. Ideal as a station clock, it offers excellent readability across the room!

### MFJ105B 250mm 24 hour clock

**\$49.88**

### 12/24 Hour clocks

Read both UTC and local time with the convenient MFJ108B dual time clock. One unit is 24 hour for UTC, the other 12 hour for local time. Or you can choose the MFJ107B single 24 hour clock.

Mounted in a brushed aluminium frame these clocks feature huge 16mm characters, long life battery included.



### MFJ107B 24 hour LCD clock

**\$24.88**

### MFJ108B Dual LCD clock

**\$49.88**

MFJ's Deluxe hybrid phone patch, the MFJ624D is designed to give you crisp, clear, hum free audio, and that is what phone patching is all about. It is pre-wired for Kenwood, ICOM, Yaesu and Alinco radios, or others using standard 3.5mm microphone connectors.

You have the option of using either VOX or Push to Talk. Pi section RF filters and PC board construction help to eliminate RF feedback into the patch unit. You can use the MFJ624D with virtually any rig.

Built-in VU meter monitors phone line levels to prevent cross-talk. Adjustable null depth permits the greatest possible isolation between transmitter and receiver, in fact there are separate gain controls for transmit and receive audio to eliminate the need to repeatedly make adjustments before and after using the patch. Phone line connections use standard 'modular' phone jacks. Jacks provided for speaker, audio in and audio out. Uses 12V DC (power supply not included) or 9V transistor radio type battery.

This American made phone patch will give you more quality and more features than patches costing many times more.

**This item is not approved for direct connection to Telecom Australia lines.**

## FAX, WeFAX, RTTY & CW with simplicity!



With the NEW MFJ1214 you will be able to use your radio to receive and transmit brilliant, full colour news photographs, incredible WeFAX maps and RTTY. With easy to use menu driven software, comprehensive manuals and the now famous MFJ JumpStart guide you will be enjoying your radio even more than ever!

The MFJ1214 is a combination software and hardware package for specific computers. Presently, versions are available for the IBM-PC and compatibles and the Commodore AMIGA. It is hoped that versions for the Macintosh and other computers will be available soon. Everything you need is included; you don't need to buy any other software to get going and the only hardware you need is a connector to suit your radio.

Enjoy RTTY, including news broadcasts, ASCII,

WeFAX for weather maps and FAX for all sorts of news service photographs as well as amateur radio operators sending FAX images to each other.

The MFJ1214 offers 16 levels of grey scale for really top quality FAX and WeFAX images. There is even a built-in timer function allowing you to begin automatic reception of weather maps which can then be saved to disk automatically, printed on your printer or both if you wish.

VERSATILE ZOOM FEATURE allows the selection and enlargement of areas of the images for close inspection of detail.

- ★ 16 level grey scale
- ★ Full colour FAX photos, up to 32,000 colours
- ★ RTTY with on screen tuning indicator
- ★ RTTY text editor built-in
- ★ Save text or images to disk or display them — your choice!
- ★ CW regeneration for cleaner signals
- ★ CW keyboard mode for effortless CW sending
- ★ Software and cables included for either IBM-PC or Amiga computers.

**MFJ1214PC** for IBM-PC

**MFJ1214AM** for Commodore Amiga

**\$345**

**\$345**

## DC Multiple outlet boxes



MFJ-1116 - Eight pairs of binding posts with switch, fuse and Ammeter. Every shack needs one!

### MFJ1116 Deluxe DC outlets

**\$112.00**

MFJ1118 - Our biggest DC outlet unit. Handles a total of 35A. You can power two HF or VHF rigs through two pairs of 30A binding post terminals, each pair is individually fused. Five pairs of terminals, with a fuse and master switch, are provided for powering accessories, with a 15A maximum current capability.



MFJ1112 - Six pairs of binding posts for general purpose 12V distribution. RF bypassing fitted to keep your DC lines clean.

### MFJ1112 DC outlets

**\$74.88**

Supplied with 6 feet of 8 gauge cable with ring terminals attached.

### MFJ1118 DC outlets

**\$162**

## SPEAKER MICROPHONES

### Compact Size



Earphone jack is provided on plug.

### MFJ283 Alinco (split jacks)

**\$62.50**

### MFJ284 Icom or Yaesu

**\$62.50**

### MFJ286 Kenwood

**\$62.50**

### Tiny size

MFJ's Tiny-sized speaker microphones give you all the features in a tiny package. High quality electret inserts and wide range speakers give superb audio quality. Each mike has an on/off switch, a swiveling lavalier/pocket clip and MFJ's unconditional one year warranty in a package only 50 x 32 x 6.5mm!

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

**\$62.50**

# Audio Processing

Timewave DSP-9



Timewave DSP-9+



Timewave DSP-59+



✓ Reduce noise & interference

Adaptive noise filter for SSB & AM

✓ Eliminate heterodynes

Multiple automatic notch filters

✓ Sharp Speech and CW filters

Linear phase FIR (finite impulse response) filters, one set for SSB, another for CW... 1.8, 2.4, & 3.1 kHz Bandpass (SSB) 100, 200 Hz & 500 Hz Bandpass (CW)

Digital signal processing is the latest revolution to hit the amateur radio scene. Properly implemented digital signal processing has the ability to enhance the performance of YOUR station. With the Timewave Technology third-generation DSP systems you get superior performance at remarkably low cost. CW filters as narrow as 100Hz that don't ring, amazingly effective heterodyne elimination and with the DSP-59+ a range of filter combinations that should cope with just about any situation, and a random noise reduction capability which really works.

**DSP-9** DSP signal processor

**\$339**

✓ Reduce noise & interference

Adaptive noise filter for SSB & AM

✓ Eliminate heterodynes

Multiple automatic notch filters

✓ Sharp Speech and CW filters

Linear phase FIR (finite impulse response) filters, one set for SSB, another for CW... 1.6, 2.0, & 2.4 kHz Bandpass (SSB) 100, 200 Hz & 500 Hz Bandpass (CW)

✓ Programmable CW centre frequencies 400, 500, 600 or 800Hz

✓ HF Data filters

For HF Packet, PACTOR, G-Tor, AMTOR and RTTY with programmable centre frequencies.

✓ Switchable AGC

The Timewave DSP-9+ adds HF digital mode filter options to the DSP-9 and incorporates switchable AGC and selectable centre frequency combinations not provided for in the DSP-9.

**DSP-9+** DSP signal processor

**\$449**

✓ Reduce noise & interference

Adaptive noise filter for SSB & AM

✓ Eliminate heterodynes

Multiple automatic notch filters

✓ Sharp Speech and CW filters

SSB: HPF 200Hz-1.6kHz LPF 1.7kHz-3.1kHz

Programmable CW centre frequencies

Centre frequencies: 400Hz-1.0kHz

Bandwidths: 25-600Hz

✓ HF Data filters

For HF Packet, PACTOR, G-Tor, AMTOR and RTTY, SSTV & WEFAX with programmable centre frequency options.

✓ Switchable AGC

The Timewave DSP-59+ offers the most flexible array of filters in the range as well as a series of programmable options to suit just about any need! Great for SWLs as well as the amateur who really seriously about working the weak signal DX stations.

**DSP-59+** Advanced DSP signal processor

**\$629**

## MFJ432 Voice Keyer

Gain an unfair advantage during a contest by cloning your voice!



buttons and still have your voice after the contest. You can store four natural sounding messages in a total of 20 seconds. EEPROM technology keeps messages stored for up to 10 years — no backup battery needed.

You can also repeat a message continuously. It makes it sooo easy to call long CQs during poor band conditions. It's easy to use — just plug your 8 pin microphone cable into the MFJ-432 and plug its cable into your transceiver's 8 pin mic connector. Internal jumpers let you customize it to your rig.

Built-in speaker lets you monitor stored messages. Has jack for remote control operation. Uses 9 volt battery (not included) or external DC supply.

Operate most of a contest by pressing a few

**MFJ432** Voice keyer

**\$219**

## HF QRP CW transceivers

- ✓ SW semi-break in CW transceiver
- ✓ Models for 15, 17, 20, 30, 40 metres
- ✓ High performance superhet receiver
- ✓ 8 pole crystal filter
- ✓ RIT and vernier tuning
- ✓ Automatic Gain Control
- ✓ Built-in sidetone generator
- ✓ Optional built-in Curtis chip keyer
- ✓ Optional narrow audio filter



**MFJ9000** series QRP transceivers

**\$399**

## MFJ9420 20mtr SSB transceiver

- ✓ 12W PEP output
- ✓ Simple operation: no microprocessors!
- ✓ RF speech processing
- ✓ 8 pole crystal filter
- ✓ Covers 14.150-14.350MHz
- ✓ Automatic Gain Control
- ✓ Dynamic microphone included
- ✓ Optional CW adaptor adds 'low end' of band coverage
- ✓ Range of accessories available



**MFJ9420X** 12W transceiver with mic.

**\$519**

The MFJ super DSP Filter automatically eliminates heterodynes, reduces noise and interference simultaneously on SSB, AM, CW packet, AMTOR, PACTOR, RTTY, SSTV, WEFAX and FAX as well as weak signal EME and VHF signals.

✓ Reduce noise & interference

Adaptive noise filter for SSB & AM

✓ Eliminate heterodynes

Multiple automatic notch filters

✓ Sixteen preset filters

Use these to programme your own.

✓ Tunable high pass & low pass filters

HPF: 200Hz-2.2kHz LPF: 1.6-3.4kHz

✓ Programmable CW centre frequencies

Centre frequencies: 300Hz-3.4kHz

Bandwidths: 50-680Hz

**MFJ784** DSP signal processor

**\$499**

## MFJ Short Wave receiver kit



Remember hunching over your regenerative receiver for hours with a pair of phones pressing uncomfortably against your ears? Did you ever wish you could relieve some of that excitement?

This little beauty performs — it has an RF amplifier stage and it goes into regeneration smoothly without pops or dead spots. Covers the popular shortwave and amateur bands. Can be operated from a 9V internal battery. Has two headphone outlets for 'Walkman' type headphones.

**MFJ8100K** SW receiver kit

**\$135**

# Keyers & code practice

MFJ's MORSE-MASTER Menu driven memory keyer!



MFJ's MORSE-MASTER is so easy to use you may never read the manual! Its unique menu system allows you to control absolutely every feature of this amazing Memory Keyer. From the menus you can:

- Save and play messages
- Set starting serial number
- Decrement serial numbers
- Set speed, weight & sidetone
- Use iambic, semi-auto or handkey modes
- Turn sidetone on & off
- Tune transmitter
- Built in sidetone speaker with tone adjustable from 300-3000Hz.
- Compensates for transmitter keying characteristics
- Keying output can be turned off for practice
- Memory can be expanded to 8000 characters

**Piggyback a MORSE MASTER onto a BENCHER iambic key**



Truly the best of all CW worlds—all of the features of the MFJ492 MORSE MASTER Keyer (with the exception of remote control and memory expansion) in a compact configuration that mounts onto a Bencher iambic paddle. You can buy either the complete combination or just the keyer for your Bencher, whatever you like.

You get all the features of the MFJ492 including message memories, Morse trainer, sidetone, automatic serial numbering and much, much more! Use 9V battery (not included) or 12-15V DC power supply.

**MFJ490** Keyer and Key \$375

**MFJ490X** Keyer only for Bencher \$248

**Deluxe Code Practice Oscillator**



The MFJ557 Deluxe code practice set features a straight Morse key on a heavy non-skid steel base. The MFJ557 lets you practice code wherever you are, and it is powered by a 9V battery (not included) or an external DC source, it's easy to use wherever you go.

A volume control is provided to permit adjustment to a comfortable listening level. A tone control permits you to adjust the frequency and for privacy you can plug in an ear-piece, or for classroom situations you can plug in an extension speaker.

Measures 216 x 57 x 95mm. Finish is all black.

**MFJ557** Code practice oscillator set \$84.10

Smooth speed control is possible from 5 to 100 WPM using the Analog Set mode where the paddle is used to vary the speed.

## MESSAGE SYSTEM

Built-in editing system allows corrections without re-entering the entire message. You can chain messages together or send them separately. You can even interrupt a message whilst it is being sent and then resume the message!

Message sequences can be repeated with pauses, so you can send CQ, interrupt to listen for a replay and recomment calling CQ with just one button. You can even insert commands for the keyer into the messages so that you can customise serial number exchanges and automatically increment numbers with just a single button push.

## POWERFUL MORSE TRAINER

With both Farnsworth and normal timing the MFJ MORSE-MASTER lets you use the common 5 character group method as well as random, 1 to 8 character groups for code practice and training. You can even create a practice session in memory then play it back later... truly amazing! Uses 9V battery (not supplied) or external 12V DC supply.

**MFJ492 MORSE MASTER Keyer** \$225

## Deluxe Electronic Keyer



The MFJ407C Deluxe Electronic Keyer can be used with a straight key, a single lever or dual lever paddle with type A or B iambic keying for sending high quality Morse code. Full iambic keying with a dual lever paddle, dot-dash insertion, semi-automatic dots and manual dashes, dot-dot memory, self completing dots and dashes, jam proof spacing and instant start keying.

Speed, weight, tone and volume controls are all on the front panel as well as ON/OFF, tune and semi-auto/auto switches. The weight control will provide negative as well as positive weighting.

The MFJ407C has a built-in speaker and uses a 9V battery (not included) or an external DC source, enclosed in a black aluminium cabinet measuring 178 x 51 x 150mm.

**MFJ407C** Deluxe electronic keyer

\$155



The SUPER MORSE-MASTER is possibly the most sophisticated memory keyer ever devised!

With the MFJ493 you get all of the features of the MFJ492 MORSE-MASTER but with a host of add-on features like these:

- 32,000 characters of memory
- Can use standard AT type keyboard for sending
- Built-in serial port for automatic control & loading memories from computer. Can edit, display and save messages remotely.
- As you key CW, ASCII is sent to serial port for monitoring or recording transmissions.
- Adds QSO simulator to MFJ492 training features.

Uses 12-15V DC supply, not included. Works with standard 101 key AT keyboard.

**MFJ493 Super MORSE MASTER keyer** \$309

## PC Memory keyer

Let this amazing hardware and software package for your IBM-PC or compatible turn your computer into a full fledged memory keyer!



With 10 banks of 10 memories you can have a total of 100 function key macros. You can send a message within a message, pause to key in information, send part of a message at a different speed. Send CW beacons, have automatic serial numbering for contesting and all of this with on-line help! You can use a straight key, a single lever or dual lever keyer or send code from the keyboard.

**MFJ1268** PC Memory keyer

\$95.00

## MFJ Stand alone MORSE KEYBOARDS

### MFJ451

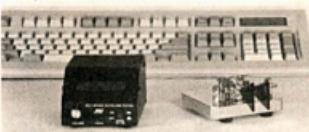
Morse Code Keyboard



\$195

The MFJ451 stand-alone keyboard has a 200 character type-ahead buffer and two 100 character message memories. With all functions controlled from the keyboard sending Morse Code has never been easier, or more fun!

## Super CW Keyboard



The MFJ452 'Super CW Keyboard' has all of the features of the MFJ451 with the addition of a two line LCD display, you see what is being sent on one line while you see what you are typing on the other, and a total of eight 2500 character memories.

Nonvolatile memory stores all your messages and settings for up to 20 years! Commands can be stored in messages, for example you can have auto-incrementing serial numbers sent automatically!

**MFJ452** Morse keyboard with display \$289

In the MFJ498 you not only get all of the features of the world's most powerful Morse code keyboard but you have 32K of lithium battery backed-up memory and a complete code training system, all in one box!

Like all of the MFJ Morse keyboards you can plug in an iambic key and use the unit as a complete high performance keyer.

**MFJ498** 32K Morse keyboard & display \$399

# Morse keys and keyers

**Solid Brass Morse Key**



The Kent Morse Key Kit is engineered to the highest specifications from solid brass. Uses solid silver contacts & sealed ball race bearings, ensuring totally free pivot movement with minimum friction and eliminating side play. Precision contact and spring adjustment with fine pitch threaded screws with instrument knurled heads.

**MM004** Morse Key Kit **\$151.25**

Bencher Iambic Keyer



**MM001** Black **\$151.25**  
**MM002** Chrome **\$187.55**

With adjustable contact spacing, precise tensioning adjustments and plated copper contacts the BENCHER keyers are truly precision instruments designed to last you a lifetime. A choice of base finishes is available with the key mechanism made from chrome plated brass. Bencher keyers work as well as they look and give you a truly "smooth as silk" keyer, whatever your needs.

Vibroplex Original



The Vibroplex Original is little changed today from the original design of 1890. Considered by many to be the greatest "semi-automatic" keyer ever made.

**MM011P** Gold base **\$420**  
**MM011D** Chrome **\$285**  
**MM011S** Grey wrinkle **\$260**

Electronic Keyer II



The MFJ401B Econo-Keyer II uses the world famous Curtis 8044ABM integrated circuit. It lets you send iambic, automatic, semi-automatic or manual with your dual lever, single lever paddle or straight key. Front panel speed control covers 8 to 50 WPM and the volume control adjusts to give a comfortable listening level. Internal controls are provided for weight, dot-dash spacing and tone. Uses 9V battery (not included), measures 102 x 51 x 89mm.

**MFJ401B** Keyer **\$106.90**

**Kent Iambic Paddle**



The twin paddle (iambic) Morse key kit can be used with the KENT iambic keyer, MFJ Morse keyers, the MFJ1278 multi-mode controller and internal keyers such as those available for ICOM or Kenwood transceivers.

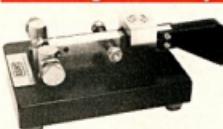
**MM005** Morse Key Kit **\$181.50**

Bencher single lever key



**MM003** Black **\$151.25**  
**MM003A** Chrome **\$187.55**

**Kent Single Paddle Key**



The KENT single paddle key is designed to allow each individual operator total flexibility in setting and adjustment, achieved by the unique springing arrangement which allows separate right and left spring tension adjustment with finger tip control.

**MM003** Keyer Kit **\$151.25**

Logikey CMOS keyer & Remote Controller



The LogiKey keyer is driven by the key itself so you don't need a host of controls. Try it, it is amazingly effective! Can be used with any iambic keyer unit, such as the Bencher, Vibroplex and MFJ units seen on these pages. (Key not included in price)

**MM008** Keyer **\$248.40**

Vibroplex Vibrokeyer



The Vibroplex Vibrokeyer is designed for the "Bug" user who wants to move to electronic keyers. Its single lever paddle arrangement initiates the automatic dots and dashes of the electronic keyer with the same motion used to operate the "Bug".

**MM013D** Chrome **\$250**  
**MM013S** Grey wrinkle **\$190**

**Kent Electronic Keyer**



The KENT Electronic Morse Keyer Kit uses CMOS logic to generate Morse at speeds from 5 to 40 words per minute at the standard dot-dash ratio of 1:3. The kit is supplied with the circuit board pre-assembled and tested. You only supply a bit of labour to complete the assembly.

**MM007** Keyer Kit **\$156**



The LogiKey keyer can be fitted with an optional remote control unit which can be mounted to the Bencher iambic keys. Take the controls of the keyer direct to the key, right where you want to use them. The remote control is shown here attached to an MM001 key. (Key not included in price)

**MM008A** Remote control **\$84**

Vibroplex Brass Racer



Available in two versions, one with an internal electronic keyer, the Brass Racer is the latest in the Vibroplex line. Using magnets for tensioning, this delightful little key is just the thing for mobile, DXpedition or portable use, just the thing when space is at a premium!

**MM014** with keyer **\$320**  
**MM015** key only **\$130**

Custom keyer for Bencher Iambic Paddles



Combine all of the features of the MFJ keyer with the Curtis 8044ABM IC and put it in a package that mounts directly onto the Bencher iambic keyers and you have the MFJ422BX! Power it with an external DC power source. Also mounts on MFJ564 paddles.

**MFJ422BX** Keyer **\$160**  
**MFJ422B** Keyer & key **\$292**



MFJ Deluxe iambic paddles feature a full range of adjustments in tension and contact spacing, self adjusting nylon and steel needle bearings, contact points which almost never need cleaning, precision machined frame and non-skid feet on a heavy chrome base. Can be used with the MFJ422BX keyer and the MFJ490X MorseMaster keyer. Chrome plated base and metal parts.

**MFJ564** Iambic paddle **\$110**

# OPTOELECTRONICS

## The Scout

The remarkable new Scout automatically finds frequencies and records them and will tune a receiver. Record a series of frequencies and then load them to a scanner for review.



- 10MHz-2.8GHz frequency range
- Six hour battery life
- Works 10-120 metres from transmitter
- Use as frequency counter tool
- Exclusive Optoelectronics digital filter and capture technology
- 50 memories for discrete frequencies
- 250 bit counter for each memory
- Reaction times some receivers
- Interfaces to PC for datalogging

**25** Frequency Scout **\$820**

## Decode tone information

The DC440 decodes CTCS5, DTMF & DCS signals output from receiver. Can be computer interfaced for logging purposes.



**DC440** Tone decoder **\$532**

## Communications Interceptors

Optoelectronics presents a totally new instrumentation concept, the Model R10 FM Communications Interceptor. Developed for two-way communications testing, it has significant impact in security, counter-surveillance and recreational communications monitoring applications.

The Interceptor™ measures deviation (wide and narrow bands), relative signal strength, signaling tones (CTCS5, DCS, and DTMF) using the companion DC440 Decoder. The R10 can be used for any measurement requiring demodulated FM. The R10 is ideal for testing VHF, UHF and Cellular transmitters and can be a low cost highly portable substitute for a service monitor in some applications.

## New Technology

The Interceptor™ responds to any strong signal present in the conventional radio receiver or scanner. Conventional receivers are stabilized and tuned to a particular frequency by an internal oscillator. The Interceptor is stabilized by the signal it is receiving. The advantage of this process is that the Interceptor™ does not have to be tuned to a frequency in order to receive a signal. Any FM signal from 30MHz to over 2GHz can be intercepted without gaps in coverage. The Interceptor™ is completely automatic for hands free operation.

## Security & Counter Surveillance Applications

This great sensitivity to Near Field signals makes the Interceptor™ ideal for RF security

## HandiCounter 3000A

The world's most highly advanced hand-held counter. Covers to 3GHz with frequency and multi-function features, Period, Ratio and Time Interval, all in the palm of your hand.



- 10Hz-3GHz, 0.1Hz resolution
- Period, time interval, ratio, average
- 250MHz direct counting
- Dual 50Ω/1MΩ inputs
- Exclusive Optoelectronics digital filter and capture technology
- 10 digit LCD display
- 1x10<sup>-4</sup>/yr time base
- Optional TCXO available
- Interfaces to PC for datalogging.

**3000A** HandiCounter **\$719**

## Collecting data with a frequency counter



Please call for details of optional interfaces and software!

## Communication, Test & Surveillance Equipment

## HandiCounter M1

The M1 counter has the same 10Hz-2.8GHz range as the 3000A but no universal counter functions. Digital filter and capture still available as well as digital communications port.



- 10Hz-3GHz, 0.1Hz resolution
- 250MHz direct counting
- 50Ω/1MΩ input
- Exclusive Optoelectronics digital filter and capture technology
- Sensitive inputs for ease of use
- 10 digit LCD display with electroluminescent backlighting
- Low power, 4 to 5 hours battery life
- Interfaces to PC for datalogging.

**M1** HandiCounter

**\$512**

## 8040 Multi-Function bench/portable counter

A 10 digit electroluminescent backlit LCD display, 3GHz performance and all the features of a universal counter make the 8040 a winner for general purpose bench, laboratory or field use.



Many Optoelectronics products, including the 25-, 3000A, M1, SSM220A and 8040 can be connected to a PC for data collection and logging. When used in conjunction with the DC440 decoder tone frequencies can be recorded as well.

The Optoelectronics R-20 AM near field interceptor is useful for detecting AM signals and measuring the strength of signals from 5-2500MHz. It can be used for amateur, CB or AM broadcast testing as well as for locating hidden transmitters (bugs) and checking microwave oven leakage.



**R20** Interceptor **\$245**

## SSB220A SSB counter

The truly unique SSB220A can measure the actual output frequency of an SSB transmitter! Also useful for general purpose applications to 3GHz.



By feeding a known audio signal to the transmitter you can easily determine which sideband and what frequency is being transmitted. The SSB220A uses the latest direct digital synthesis and digital signal processing technologies.

**SSB220A** 3GHz SSB counter

**\$825**

# THE NEW 1995 ARRL HANDBOOK

Every so often, a book comes along which becomes an instant classic. It's no exaggeration to describe the 1995 edition of the ARRL Handbook for Radio Amateurs in those lofty terms.

For this edition, the ARRL assembled the best and most knowledgeable writers on subjects ranging from analogue electronic theory to transceivers, repeaters to DSP, circuit construction to interference, transmission lines to antennas and propagation. If it's amateur radio, it's in the 1995 Handbook... It would be impossible to list all the features that make this respected book the one reference all amateurs around the world will find indispensable. A few highlights will provide an idea of the scope of the 1995 Handbook:

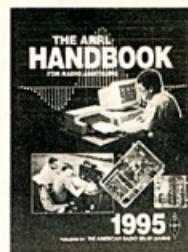
- In the Modes chapter, you'll find an overview of the many ways amateurs communicate, from the on/off keying of Morse Code to the complex but

powerful digital techniques which will guide amateur radio communication into the next century.

- Whether you're an experienced builder or a neophyte, you'll find the Circuit Construction chapter useful as it takes you from schematic to finished project.
- The ARRL/RF Sources chapter explains, clearly and concisely, modern oscillator and synthesizer design.
- Mathematics for Amateur Radio provides a refresher course in the math concepts which form the basis of amateur radio and electronics.
- The Station Setup and Accessories chapter shows how to set up or enhance your station for top performance; among other projects, includes a boom/bust head mic and three computer interfaces.
- In the Transceivers chapter, you'll learn about the systems and design which go into modern radio equipment. Projects include a beginner's shortwave receiver, QRP transceiver, and a 50W solid-state linear amplifier.
- The References chapter brings together, into one place, the tables and charts amateur need and use most often.

**Order Code BR369** © 1995 ARRL

**\$66.00**



## REFERENCE, PRACTICAL CIRCUITS & DESIGN

radio  
communication  
handbook

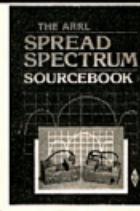
Solid State Design  
FOR THE RADIO AMATEUR

Ham Radio  
Communications Circuit Files

THE ARRL  
SPREAD SPECTRUM  
SOURCEBOOK

Pat Hawker, CB#  
amateur radio  
techniques

Technical Topics  
Scrapbook



### RADIO COMMUNICATION HANDBOOK — RSGB

The RSGB's Radio Communication Handbook, 5th Edition reprinted 1989. The society does not revise this handbook annually (or even frequently). Instead, the book changes when technology has changed sufficiently to justify it. This means that each new edition is virtually a new book, each chapter being completely revised and updated. And it's practical down-to-earth information which every amateur needs... One of the attractions of radio communication is the way in which fundamental ideas and techniques remain valid in the mist of innovation. This large handbook with 22 chapters will help in many ways.

**Order Code BR266** 5th ed. © 1988 RSGB

**\$56.00**

### HAM RADIO COMMUNICATIONS CIRCUIT FILES

Volume 1 by Ed Knoll, W3FQJ, first printed 1980, reprinted 1991 - Large 210 x 275mm 86 pages. Even the casual experimenter can become expert with Ed Knoll's Ham Radio Communications Files. This book covers bipolar and field-effect transistors and linear ICs. Each circuit has been built and carefully checked out by the author. The component values are given on each schematic diagram. An explanation and often a suggested experimental procedure are included with each circuit.

Teach yourself solid state electronics by beginning with the first circuit and proceeding through the 61 circuits in this easy-to-follow book. The circuits are arranged for progressive study as in a course with experiments.

Teachers or experienced hobbyists will find they can go directly to the individual chapters for inspiration or ready-to-use circuits.

**Order Code MFJ37** 1st ed. © 1980 MFJ

**\$24.95**

### AMATEUR RADIO TECHNIQUES

By Pat Hawker, G3VA. This is an ideal book and a source book, not a conventional text book. It assumes the reader has (and uses!) his or her handbooks and therefore does not repeat basic theory and practice. Instead, it concentrates on new or little-understood techniques; some sophisticated, but many others which can be simply incorporated into an amateur station. This ever-popular work brings together a variety of circuit ideas and devices, information on antennas, plus many constructional and fault-finding hints, gathered in over 22 years of writing the Technical Topics column in the RSGB's Radio Communication.

Chapter headings: • Semiconductors • Components and Construction • Receiver Topics • Oscillator Topics • Transmitter Topics • Audio and Modulation • Power Supplies • Aerial Topics • Fault-Finding and Test Units.

**Order Code BR393** 7th ed. © 1991, RSGB

**\$30.00**

### THE ARRL ELECTRONICS DATA BOOK

Doug DeMaw, W1FB, presents a handy reference for the RF design engineer, technician, radio amateur and experimenter. This one source has all of those regularly-used tables, charts and those hard-to-remember formulas. You'll also find hundreds of popular circuit diagrams of oscillators, mixers, amplifiers and other devices, and their operating parameters including ferite materials. This book may be used alone or to complement The ARRL Handbook and belongs in every technical library.

**Order code BR201** 2nd ed. © 1988 ARRL

**\$40.00**

### AMIDON FERRITE & POWDERED IRON

#### TECHNICAL DATA BOOK

This edition of the very popular Amidon Data Book was completely revised and updated in 1992. This volume contains inductance charts, flux density curves and wire turns charts on iron powder and ferrite cores for RF, RFI suppression, switch-mode power supplies and broadband transformer applications. It also covers surface-mounting beads, RF coil assemblies, "E" cores, rods and pot cores. Many new sizes and shapes have been added since the last printing. Daycom stocks ALL the items in this book.

**Order code BR44** © 1992 Amidon Associates

**\$12.50**

### TECHNICAL TOPICS SCRAP BOOK

"Technical Topics" is one of the most popular columns in the RSGB's magazine Radio Communication, and has been for many years. Each month Pat Hawker presents an invaluable selection of circuit ideas and devices, information on antennas and related topics, plus many constructional hints. This book contains the complete Technical Topics column from 1985 to 1989 inclusive, together with a new index.

**Order code BR37** 1st ed. © 1993 RSGB

**\$35.00**

### SPREAD SPECTRUM SOURCEBOOK

If you're tired of hunting for bits and pieces of information on spread spectrum, the ARRL Spread Spectrum Sourcebook is for you. You'll find reprints of most spread spectrum articles from QST and QEX, as well as articles and news items from the AMRAD Newsletter. Also included in this 384-page softcover book is historical information on spread spectrum's beginnings and an introduction by Robert Dixon, a well-known author on the subject.

All the information you want — in one place — at your fingertips! The hunt is over...

**Order code BR365** 1st ed. © 1991 ARRL

**\$52.00**

### SOLID STATE DESIGN FOR THE AMATEUR

First published by the ARRL in 1977 and reprinted by popular demand with corrections. This large book of 256 pages by Doug DeMaw and Wes Hayward has become the "bible" of many an avid home-brewer, and with good reason. Solid State Design for the Radio Amateur is among the select few technical books which have sold more than 50,000 copies. Why has it achieved this enviable milestone? For one thing, it's chock full of good, basic information — circuit designs and their applications and descriptions of receivers, transmitters, power supplies and test equipment. Much of the data such as that on transistor modelling cannot be found in any other publication.

**Order code BR171** 1st ed. © 1977 ARRL

**\$32.00**

### HINTS AND KINKS FOR THE RADIO AMATEUR

This book from the ARRL is a collection of practical ideas from the ever-popular Hints and Kinks column of QST. Amateur radio know-how from amateurs who know how. Every article is new — this edition is not just an update. Join the contributors to QST's most popular technical column as they share hands-on experience in virtually every aspect of amateur radio. Whether you sample the delights by way of mic, key, keyboard or camera; whether you prefer the test bench to the traffic net or mobile to moonbounce; whether your enjoyment of amateur radio spans days or decades. Hints and Kinks has fixes, tips, updates, projects, antenna systems and many practical tips. Offers many modifications to popular rigs including Icom, Kenwood, Yaesu, AEA, Ameritron, Drake, Heath, MFJ, Ten-Ten and Collins. 172 pages 210 x 275mm.

**Order code BR330** 13th ed. © 1992 ARRL

**\$26.00**

### W1FB'S DESIGN NOTEBOOK

Do you like to build amateur radio equipment? Would you like to? If your answer to either of these questions is yes, then this book by Doug DeMaw, W1FB is for you. The infamous Doug strikes again! Another supremely practical book published by the ARRL, this plain-language book is filled with simple, practical projects which can be built using common hand tools. You'll need no exotic or hard-to-find components to build the projects, nor will you need elaborate test equipment to make them work. The book is full of all sorts of useful information on designing and building your own equipment. Has complete receiver and transmitter designs as well as all sorts of useful info and partial designs for the home-brewer.

**Order code BR357** 1st ed. © 1990 ARRL

**\$26.00**

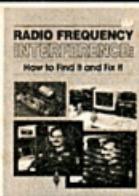
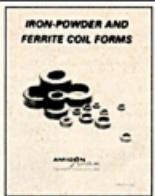
### TRANSMISSION LINE TRANSFORMERS

This second edition includes some 100 extra transformers, many interesting and unexpected designs, using both the Rutroff and Guanella approaches. Though the primary goal of the book is to supply a great variety of transformers for matching 50Ω coils to antennas in the 1.5 to 30 MHz range, many of them should perform well in other areas. Dayton Communications stocks most of the ferrite materials used in this book. 150 x 230mm hard bound

**Order code BR329** 2nd ed. © 1991 ARRL

**\$52.00**

# REFERENCE, PRACTICAL CIRCUITS & DESIGN (cont.)



## MOTOROLA RF DEVICE DATA 1994

This 6th edition has been revised in 1994 in one volume. It presents technical information for the several product families that comprise the Motorola portfolio of RF products. They include bipolar, LDMOS, MOSFET RF power and Gallium Arsenide chip technologies in a variety of packages, also discrete components, hybrid modules, and integrated circuits. This new edition presents a considerable number of changes.

**Order code BR47** © 1994, 6th ed. Rev. 4

\$42.00

## MOTOROLA RF AND VIDEO APPLICATIONS

This application book from Motorola has a total of 37 application notes on a wide range of RF and video applications. Some of the applications include... • Get 600 watts RF from four power FETs • Low-cost device gives broad band performance at 3 watts out • 300 watt amplifier using TP1940 MOSFET push-pull transistors • Phase-Locked Loop design fundamentals • Impedance matching networks applied to RF power transistors • A simplified approach to VHF power amplifier design • Tuning diode design techniques

**Order Code BR428** DLE411/E

\$65.00

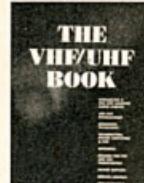
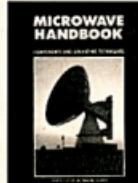
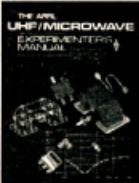
## MOTOROLA COMMUNICATIONS APPLICATIONS

This application book from Motorola contains a total of 44 application notes on a wide range of communications subjects. Some of the applications include... • MC1596 balanced modulator • Line driver and receiver applications • Equalization of DTMF signals using the MC34014 • VHF narrow band FM receiver design using the MC3362 and MC3363 dual conversion receivers • Infrared sensing and data transmission fundamentals • MC68HC05B4 radio synthesizer • Low power FM transmitter system MC2831A • Basic concepts of fibre optic communications • Serial to parallel converter using the MC6870P3.

**Order Code BR376** DLE411/E

\$58.00

## VHF and MICROWAVE



## THE ARRL UHF/MICROWAVE EXPERIMENTER'S MANUAL

This book is written for the growing number of radio amateurs who are discovering that there is life on our frequencies above 420MHz! Chapter topics of this 448-page book include... • A brief history • Safety • Propagation • Microwave devices • Transmission media • Design techniques • System design • Microwave fabrication techniques • Antennas and feedlines • Earth-Moon-Ham (EME) communications • Getting started in microwave measurements, and • Tackling microwaves with microcomputers. 448 pages, 200 x 280mm. There are 26 programmes for PC-compatible computers on diskette (available separately) to aid in performing various tasks described in the book.

**Order code BR325** 1st ed. ©1991 ARRL

\$52.00

**Order code BR327** 5.25" or 3.5" (State which when ordering)

\$22.00

## RSGB MICROWAVE HANDBOOKS

Microwave Handbook Volume 1, ©1989, covers operating techniques, systems analysis and propagation, microwave antennas, transmission lines and components, microwave semiconductors and tubes. Microwave Handbook Volume 2, ©1991, continues where Volume 1 leaves off, with construction techniques, common equipment, microwave beacon and repeaters, test equipment, safety, filters and additional circuit data. Microwave Handbook Volume 3, ©1992, contains a review of microwave theory and practice, reference information, practical designs, hints and tips. Covers 1.3-24GHz.

**Vol. 1 - BR318 Components & Operating Techniques**

\$38.00

**Vol. 2 - BR437 Construction & Testing**

\$57.00

**Vol. 3 - BR447 Bands & Equipment**

\$57.00

## ALL ABOUT VHF AMATEUR RADIO

By William J. Orr, W6SAI, this VHF handbook is for every amateur on six metres and up. Contains... • VHF propagation • The VHF bands, an overview • The VHF repeater and how it works for you • VHF moonbounce communications • Amateur satellite communications • VHF vertical and mobile and beam antennas you can build • VHF interference and how you can suppress it.

**Order code BR216** 2nd ed. ©1988

\$25.60

## INTERFERENCE HANDBOOK

By William R Nelson, WA6FQG, and edited by Bill Orr, W6SAI. WA6FQG is a former RFI investigator for Southern California Edison Company. This 250-page book is written from an RFI sleuth's perspective and is a diary of his experiences in solving interference problems. His experiences run the gamut from the common (arcing thermostats) to the bizarre (loose metal sheathing in a temporary building next to a 250kV transmission line). Besides all sorts of power line interference causes and solutions, this book covers electrostatic discharge (rain or snow static), grounds and grounding, vehicle noise suppression, RFI from non-linear devices, how the power company locates RFI, how to RFI-proof your transmitter, how some receivers suffer from self-inflicted RFI, and solutions to RFI in various electronic devices.

**Order code BR181** 2nd ed. 1988

\$25.60

## RADIO FREQUENCY INTERFERENCE

### How to Find It and Fix It

What is it? • Black bars that flash across a TV picture in a curious, rhythmic pattern. • A garage door opener which opens or closes the door by itself. • A raucous buzz which draws out AM stations. • Car engine stumble or hesitation near radio towers. • A touch-controlled lamp with a mind of its own. These strange behaviours [and countless others] may be effects of electromagnetic interference.

If you experience these or similar problems, this book can help. Here, the ARRL has combined the work of numerous interference experts for your convenience. Chapters explain how to... • Locate the source • Resolve conflicts • Locate interacting equipment • discuss RFI/EMI problems and cures for specific electronic systems: Transmitters; Stereos and other audio devices; Televisions; Power Lines; Computers; Telephones; and Cars.

This book is published by the ARRL, paperback, 210 x 275mm.

**Order Code BR186** 1st ed. ©1991 ARRL

\$40.00

## THE VHF/UHF MANUAL

By G. R Jessop, G6JP. This tome has long been the standard text book on the theory and practice of amateur radio between 30MHz and 24GHz. No serious VHFer should be without this book. You'll find information on the history of VHF/UHF communications, propagation, tuned circuits, receivers, transmitters, solid state and valve equipment, filters, antennas, microwaves, space communications and test equipment.

**Order code BR267** 4th Edition © 1983 RSGB

\$40.00

## THE VHF/UHF DX BOOK

The VHF/UHF DX Book from DIR Publishing of the UK helps you with one of amateur radio's greatest challenges: contacting stations in far away places. Here's some of what you'll find: • how to assemble your VHF/UHF station • VHF/UHF propagation information • operating techniques • designs for UHF and VHF transverters • antennas • transmitters • power amplifiers & EMC • power supplies • station control • test equipment. Much more.

**Order Code BR27** 1st ed. ©1992 DIR Publishing

\$52.00

## THE UHF COMPENDIUM from Germany

Parts 1, 2, 3 & 4 of this work are available in English. Parts 1 & 2 are contained in Volume I. Parts 3 & 4 are found in Volume 2. Part 5, printed only in German, is in Volume 3. All Volumes are 8.5" x 11".

**Vol. 1** (parts 1 & 2)

BR250

\$75.00

**Vol. 2** (parts 3 & 4)

BR251

\$75.00

**Vol. 3** (part 5, in German only)

BR354

\$62.50

## YOUR VHF COMPANION — ARRL

Your VHF Companion lets you explore the fascinating activities on the VHF bands: FM and repeaters, packet, CW and SSB, satellites, amateur television, transmitter hunting and more. A helpful reference section helps you locate equipment, books, magazines and software. A must for all new hams and all 'veterans' as well!

**Order Code BR461** 1st ed. ©1992 ARRL

\$21.00

# VHF/UHF/MICROWAVE & PACKET CONFERENCE PROCEEDINGS

The following volumes represent much of the most interesting material presented at the five of the largest VHF/UHF conferences in the English-speaking world. These collections are essential reading for anyone interested in operation at or above 70cm.

## AMSAT-NA PROCEEDINGS

1987	ORDER CODE BR199	\$10.00
1988	ORDER CODE BR378	\$17.00



## MICROWAVE UPDATES

Microwave Update 1993	ORDER CODE BR467	\$32.00
Microwave Update 1994	ORDER CODE BR51	\$32.00
Microwave Update 1995	ORDER CODE BR163	\$17.00
Microwave Update 1996	ORDER CODE BR174	\$17.00

## VHF SOCIETY PROCEEDINGS

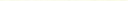
27th Central States VHF Society Oklahoma City, Oklahoma 1993	ORDER CODE BR470	\$32.00
28th Central States VHF Society Oklahoma City, Oklahoma 1994	ORDER CODE BR50	\$32.00



## PACKET RADIO PROCEEDINGS

Each of these volumes contains a wide range of papers on all forms of digital modes and presents the history of packet radio from day one.	ORDER CODE BR174	\$32.00
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Number 11, 1992



## PACKET RADIO ... RTTY ... AMTOR BOOKS



### PROH: Packet Radio Operators Handbook

Buck Rogers, K4ABT, packet radio editor of CQ Magazine — the godfather of packet radio — spent two years compiling information to write the most comprehensive handbook ever for the packet radio user. With PROH you can become a PRO by having this handbook as ready reference for the most useful applications in packet radio today. In this book you will learn everything you need to know to build a packet station. It covers all modes in use today including ROSE and 9600 baud operation.

**Order code MFJ3036**

**\$26.00**

### YOUR GATEWAY TO PACKET RADIO

All the answers and much more are in this book by Stan Horzepa, WA1LOU, published by the ARRL.

In the five years since the ARRL first published Your Gateway to Packet Radio, interest in packet has exploded! To keep up with the expanding interest and evolving technology, this second edition contains 73 more pages — nearly 50 per cent of the original material has been revised. Newcomers will still find the basics on installation and operating procedures.

**Order code BR169** 2nd Edition ©1989 ARRL.

**\$32.00**

### THE PACKET RADIO OPERATORS MANUAL

This new packet radio manual from CQ Communications written by Buck Rogers, K4ABT is a big 220 x 228mm and contains 162 pages. Covers packet radio, packet video, networks, nodes, gateways, antennas, RFI causes, defining RS232... and a lot more.

**Order code BR43** ©1993 CQ Communications.

**\$37.50**

### AX.25 Amateur Packet-Radio Link-Layer Protocol

This protocol is intended as a guide to aid in the design and use of amateur packet-radio systems, in order to ensure link-layer compatibility between stations. The link layer is level 2 of the International Organisation for Standardisation (ISO) seven-layered reference model of Open Systems Interconnection (OSI).

**Order code BR178** Version 2 ©1984 ARRL.

**\$20.00**

## PRACTICAL FILTER DESIGN

Although filters are basically easy to understand, you don't get this impression from most books! This is a non-mathematical treatment for electronics hobbyists and technicians.

This Australian-published book, written by Jack Middlehurst, looks at the circumstances where filters are needed, indicates which ones to choose for specific applications, and discusses their laminations. Details are given of the circuits, construction and tuning of LC filters, as well as simple active filters, state variable filters and switched capacitance filters. Butterworth, Chebychev and elliptic forms of low-pass, high-pass and band reject filters are described, as well as active and passive crossover and notch filters.

To truly remove any difficulties with mathematics, computer programs in GW BASIC are provided on disk so that filters and their properties can easily be predicted.

**ORDER CODE BR472 \$35.95 Includes free 3.5" DISK**



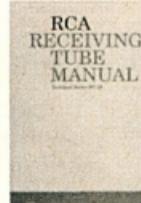
## RCA RECEIVING TUBE MANUAL

We have obtained a shipment of RCA Tube manuals from the USA. Published in 1959 (not a copy) this manual has a most complete data section covering values from the '30s to the end of the valve era. There is also approx. 68 pages of valve application data including information on valve testing and a section on circuit design in all, 385 pages of information.

This manual has been prepared to assist those who work or experiment with electron tubes and circuits. It will be valuable to engineers, service technicians, experimenters, students, radio amateurs and all others technically interested in electron tubes.

**Order code BR34**

**\$22.00**



## PACKET RADIO ... RTTY ... AMTOR BOOKS



### PACKET RADIO PRIMER

From the RSGB, this book is written by Dave Coomber, GBUVZ and Martyn Croft, GBNZU. This introduction to the exciting new world of packet radio will help any beginner to get started with the minimum of fuss. Detailed, practical advice on connecting equipment followed by a guide through the maze of configurations possible.

**Order Code BR440** ©1991 RSGB

**NOSintro**

**\$28.00**

An introduction to the KA9Q Networking System by Ian Wade, G3NRW. In NOSintro you'll find a wealth of practical information, hints and tips for setting up and using the KA9Q Networking Operating System (NOS) in a packet radio environment. The emphasis is on hands-on practicalities. You'll see how to install NOS on a PC, how to set up the control files, and lots more.

**Order Code BR468**

**Your RTTY/AMTOR COMPANION**

**\$45.00**

Explore HF digital communications with your multi-mode controller. This book, by Steve Ford, WB6IMY, is your introduction to the exciting world of HF digital communications. Learn how to assemble your own RTTY/AMTOR station and communicate effectively on the air. You'll also learn the basics of new HF digital modes such as CLOVER and PACTOR.

**Order Code BR45** 1st ed. ©1993 ARRL

**RTTY TODAY**

**\$21.00**

This is the only modern book on RTTY that we know of for the radio amateur. Home computer systems used with multi-mode controllers and dedicated electronic terminals have opened the way for everyone to enjoy the action regardless of their technical background.

**Order Code BR003** Universal Electronics ©1993

**THE RTTY LISTENER**

**\$20.50**

The RTTY LISTENER is a special magazine to inform and educate amateurs and SWLs on tuning various types of Digital Signals. This book contains issue #1 through 25.

**Order Code BR23** ©1991 2nd ed. Universal Radio

**RTTY Listener issues #26 to 30.**

**\$40.00**

**Order Code BR24** ©1992 1st ed. Universal Radio

**RTTY Listener issues #31 to 33.**

**\$12.50**

**Order Code BR42** ©1994 1st ed. Universal Radio

**RTTY Listener issues #34 to 37.**

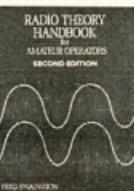
**\$9.50**



# HELP FOR NEW HAMS & MORSE

## AUSTRALIAN RADIO THEORY HANDBOOK

This 1991 edition by Fred Swainston was written to cover the Australian SAMA syllabus for the Novice and Amateur Operator Certificates of Proficiency. It contains the theory necessary to pass the Australian Certificates of Proficiency and is concise and easy to understand. The books sets out to teach those who have no knowledge of radio theory or electronics. The subjects in the book are presented in a logical sequence with test questions at the end of each chapter, covering key points in the text. A separate chapter on the mathematics required for amateur examinations has also been included, because this area often presents a problem to those studying radio theory. Sample examination papers are included. 341 pages 1991 11" X 8"



**Order code BR265** 2nd ed. 1991 \$47.95  
FIRST STEPS IN RADIO

This book is a reprint of the wide-ranging First Steps in Radio series by Doug DeMaw, W1FB, published 1984 and 1985 in QST. The entire QST series is reproduced here. You will find this book a great help for newcomers to learn the electronic theory needed for licensing exams and to gain some insight into how radio equipment works.

In First Steps in Radio you will find basic explanations of circuit components, see these components assembled into practical circuits, and see how the circuits make up your radio gear. Additional segments cover antennas, propagation and radio frequency interference at a beginner's level.

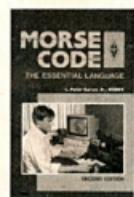
Although you may never "roll your own" equipment, you will gain an understanding of what goes on behind the front panel and take pride in that knowledge.

**Order Code BR385** 1st ed. ©1985 ARRL  
MORSE CODE: THE ESSENTIAL LANGUAGE \$16.00

Written by L Peter Carron, W3DKV, this book tells of the evolution from the straight key to computers. It gives practical advice on learning the code and everyday uses. There are sections on: What is Morse code? • A history of telegraphy • The code • Learning to receive and send • High-speed operation • Distress calls • The future.

The history of Morse Code is steeped in tradition, not only in amateur radio but in other services as well. Although some of the thoughts it conjures up are of times gone by, the code is as useful today as it was on the day of its invention. The 1991 edition of this small book will help you find out much, and help you to learn or relearn the code.

**Order code BR223** ©1990 ARRL \$16.00



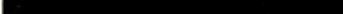
**VIBROPLEX COLLECTORS GUIDE**

This new book, written by Tom French, W1IMQ, is a must for anyone interested in Morse keys. There are reproductions of every Patent for the Martin keys. The AUTOPLEX in 1903, then the first VIBROPLEX key in 1904. All the patents are reprinted in full, complete with the original patent drawings.

Many details and old advertisements are reproduced to aid in identifying the manufacturing date of your bug. Also chapters on adjusting your bug and the 'collectible' keys. 215 x 280mm

**Order Code BR25** \$45.00

**VIBROPLEX**  
Collector's  
Guide



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**G-QRP CLUB**

**ANTENNA HANDBOOK**

**G-QRP CLUB**

**CIRCUIT HANDBOOK**

**G-QRP CLUB**

**QRP CLASSICS**

# ANTENNA BOOKS

## THE ARRL ANTENNA BOOK 17th ED 1994



The 17th Edition (1994) of the ARRL Antenna Book. Editor R Dean Shaw, N6BV • With 28 chapters • Over 700 pages • Over 900 figures • A 14 page index. This book covers everything from dipoles to multi-element stacked arrays. Several chapters have been completely rewritten, benefiting greatly from the latest computer modelling programs. The HF chapter is completely new, with more than 70 optimised designs for the HF bands. The propagation chapter contains extensive tables on the elevation angles necessary for communication throughout the world. FREE with this book is a 3.5" disk of antenna-related software for the PC. Included is a state-of-the-art Yagi Analysis program. The 17th edition is certainly big (210 x 270mm and 35mm thick, 736 pages).

**Order code BR370A** ARRL ©1994 \$65.00

With FREE Computer Software

## Antennas and Techniques for Low-Band DXing

By John Devoldere, QN4UN

Crammed with antennas and techniques, LOW-BAND DXing can be your ticket to low-band success. Draws on the experiences of successful DXers and the author's own considerable experience. John Devoldere shares with you the tips and techniques that can make the difference between a station that's just OK and one that's outstanding.

You don't need to be a mathematician in order to duplicate the standard antenna designs presented. The 393 pages are packed with antenna designs—covers feed lines too—with equipment reviews, low band propagation, operating techniques and much, much more.

**BR195** ARRL 2nd Edition ©1994

\$52.00



## W1FB'S ANTENNA NOTEBOOK

By Doug DeMaw W1FB

You will find no high-level maths in this publication. You will find some simple equations where they are necessary to explain a concept or to calculate the length of an antenna element and its matching section. Explicit drawings with numerous labels are used in an effort to clarify the illustrations to the fullest measure.

For the most part this book presents simple wire and tubing antennas that can provide satisfactory performance for a host of operating objectives. This text also dispels some of the common misconceptions about antennas which get passed over the air and at hamfests. Free advice is not always accurate, despite the good intentions of the giver who offers his assistance. 128 pages 200 x 280mm

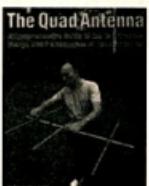
**Order code BR179** ARRL ©1991 \$26.00



## THE QUAD ANTENNA

A comprehensive guide to the design and construction of high-performance quad antennas by Bob Haveland, W4MB. This large 220 x 280mm book is the only book we know of for the Quad antenna. It has chapters on • Delta Loops and arrays • Mechanical design • Optimising a Quad design • Ground elements • Multi-band Quad feed systems • Multi-element Quads, plus many more. Haveland first began his Quad work 20 years ago when he moved to a location which wouldn't support a full-size Yagi, and decided a Quad would provide a smaller size alternative.

**Order Code BR41** CQ 1993 1st ed. \$37.50



## REFLECTIONS: TRANSMISSION LINES AND ANTENNAS

By M. Walter Maxwell, W2DU. Time to explode all the myths about VSWR, and this is the book to do it! This in depth but extremely readable and understandable book discusses every aspect of SWR, antenna matching, transmission lines and gain design. The author was a noted antenna designer at RCA for many years.

**Order code BR348** ARRL \$52

**Order Code BR348A** 5.25" IBM Disk \$22

## ELECTRONIC SOFTWARE COMPENDIUM

From Buckmaster Publishing comes this CD-ROM collection of thousands of IBM-PC and MAC programmes for electronics and amateur radio. This carefully selected compilation should give every hobbyist something they need, lots of packet and antenna programmes.

**Order code BR497** ARRL \$45



# ANTENNA IMPEDANCE MATCHING

## ANTENNA IMPEDANCE MATCHING

Proper impedance matching of an antenna to a transmission line is of concern to antenna engineers and to every radio amateur. A properly-matched antenna is the termination for a line minimises feed-line losses.

Complex matching networks can be developed using the Smith Chart, and no special expertise is needed. In a typical situation, both the antenna impedance and the transmission line impedance are known, the designer simply moves the antenna impedance points on the Smith Chart to find the most effective matching network. There is no mystique involved in designing even the most complex multi-element networks. Instead, a logical step-by-step procedure is followed, as discussed within the pages of this book. With an understanding of this information, antenna engineers and dedicated amateurs alike will find it a relatively simple task to design networks that will yield optimum performance.

**Order code BR257** ARRL ©1989 \$52.00



## TRANSMISSION LINE TRANSFORMERS

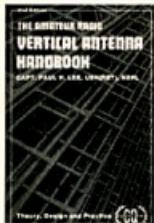
Includes some 100 new transformers for the second edition, many interesting and unexpected designs, using both Rutherford's and Guanella's approaches.

Though the primary goal of the book is to supply a great variety of transformers for matching 5000 cable to antennas in the 1.5 to 30 MHz range, many of them should perform well in other areas. Topics covered in the 15 chapters in this edition: • Analysis: the basic building block • The Guanella Analysis • The Rutherford Analysis • High frequency characterisation • Transformer parameters for low and high-impedance applications • Three chapters on unbalanced-to-balanced transformer designs • Baluns • Multi-match transformers • Material and power ratings • Simple test equipment • Hints & kinks • Selecting feeders • Windings • Transformers • Constructing low-impedance coaxial cable. Dayton stocks many of the ferrite materials used in this book. 150 x 230mm, hard bound

**Order code BR329** ARRL ©1991 \$52.00



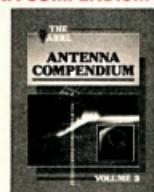
## THE VERTICAL ANTENNA HANDBOOK



This book contains 20 chapters on the design and building of vertical antennas. • Optimum antenna design for DX • Basic principles of vertical antennas • Base impedance and methods of feeding and matching • Short vertical antenna considerations • Directional vertical antenna design • Technical aspects of vertical stacking • Broad-band vertical antenna designs and configurations • Designing a specific directional vertical antenna including feed system • Using a equilateral triangle configuration for a simple directional array • The operation and design of the folded unipole antenna • The effects of earth on the efficiency of radiation and vertical pattern. Several practical designs are included.

**Order code BR284** CQ ©1984 \$22.00

## THE ANTENNA COMPENDIUM now 3 volumes



Three volumes are now available in the ARRL Antenna Compendium series, and each is packed with previously unpublished articles on all the popular types of HF/VHF/UHF antennas and some you've never heard off! In Volume 1 you'll find articles on a multiband portable, quads and loops, baluns and the Smith Chart. Volume 2 features several verticals, attic tri-bander, antenna modeling and propagation. Among the 40 articles in Volume 3, you'll discover a 12-meter quad, a dipole, modeling with MININEC and VHF/UHF ray tracing.

All 3 Volumes are a feast for the antenna enthusiast! Companion software is available separately for Volume 2 and 3.

**Volume 1** ARRL 1st ed. ©1985

**Volume 2** ARRL 1st ed. ©1989

**Volume 3** ARRL 1st ed. ©1992

**Software (5.25") Vol. 2**

**Software (5.25") Vol. 3**

**Software (3.5") Vol. 3**

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**BR455A**

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## ANTENNA BOOKS continued

### HF ANTENNAS FOR ALL LOCATIONS

HF Antennas for All Locations by Les Moxon, G5XN, (RSGB) is renowned worldwide as probably the most in-depth look at practical amateur radio HF antennas available. This second edition has been completely revised and greatly expanded. There are more novel antenna designs, including beams which cover more bands with fewer problems, no trap losses and better rejection of interference and a new chapter presents a comprehensive review of the ways to make antennas smaller, with particular emphasis on small transmitting loops. 7" x 9.5" 322 pages

**Order Code BR188** ©1993 RSGB \$45.00



### YAGI ANTENNA DESIGN

Yagi Antenna Design is based on the series in Ham Radio magazine by the late Dr James L Lawson, W2PV. Jim designed and built a highly-competitive and successful amateur radio contest station. The 210 pages in this hard-bound book cover the following subjects: • Performance calculations • Simple Yagis • Performance optimisation • Loop antennas • Ground effects • Stacking • Practical designs • Designs for 7 through 28 MHz. Copyright 1986, 210 pages

**Order code BR164** ©1991 ARRL \$40.00

### PHYSICAL DESIGN OF YAGI ANTENNAS

This hard-bound book published by the ARRL in 1992, was written by Dr David B Leeson, W5QHS. It provides the tools for you to design and build robust Yagi antennas, using sound mechanical engineering principles. Leeson shares in detail his procedures for determining mechanical stress from wind and ice on elements, booms and masts. He includes abundant information on hardware and assembly techniques for survivable Yagi antenna systems. The electrical significance of the resulting physical design is also treated thoroughly.

You will no longer fear the consequences of wind and ice storms on your antenna. With this information you can build or 'beef up' existing Yagis so, like Leeson's, they will function in winds of 160 km/h and beyond.

**Order Code BR388** ©1992 ARRL \$52.00  
**5 1/4" IBM Disk BR388A** \$26.00

### ANTENNAS by John D Kraus WBJK

This second edition of ANTENNAS is the bible on antennas. Physical concepts are emphasised which aid in the visualisation and understanding of the radiation phenomenon. The new edition contains practical applications to real-world situations and much information that has made available in the form of many simple drawings, graphs and equations.

Following a brief history of antennas in the first chapter, the next three chapters deal with basic concepts and the theory of point sources. These are followed by chapters on Linear, Loop, Helical, Biconical & Cylindrical antennas. Then on antenna arrays, reflectors, slot, horn, complementary and lens antennas. The last four chapters discuss broad-band and frequency independent antennas, for special applications including electrically small and physically small antennas, remote sensing, radar scattering and measurements. The appendix has many useful tables and references. Hard bound, 892 pages.

**Order code BR259** \$104.00  
**PRACTICAL ANTENNA HANDBOOK**



By Joseph J Carr. It covers all frequencies from 160 metres to UHF and microwaves. It starts off with chapters on propagation and transmission lines. The transmission line chapter contains many no-nonsense equations, and that's really all we need to understand and construct transmission lines. Smith charts are also covered. Without an understanding of these, stubs and matching sections become very difficult.

There is a chapter on antennas for town-house and apartment dwellers. Many practical construction techniques are described and there is a very good section on grounding. The computer programs for antenna design section is very informative and there is plenty of information for 'hackers'.

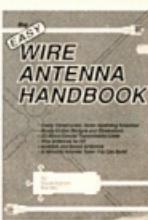
**Order Code BR26** 1st ed. ©1989 TAB \$44.00

### MicroSmith V2.00 SOFTWARE

ABR MicroSmith V2.0 by Wes Hayward, W7ZOI, is a Smith Chart simulation program for the IBM PC and compatibles. You don't need detailed knowledge of Smith Charts. Use MicroSmith to design matching networks with fixed or variable L-C components, stub-matching sections with transmission lines and more. It's all done graphically on your computer screen. It's also useful for a variety of network analysis problems. Includes a 48-page user's guide with numerous illustrations.

**Order Code BR499** 3.5" Diskette \$95.00

### THE EASY WIRE ANTENNA HANDBOOK



The inexpensive and most effective way to successful DXing. What's the least expensive and most effective way to equip your new transceiver, QRP rig or classic transmitter and receiver setup for worldwide amateur radio communications? Use a home-made wire antenna, that's it! This 1992, 220 x 228mm, 112-page book by Dave Ingram, K4TWJ, is dedicated to fulfilling that exact purpose. It's chock full of ready-to-use designs and dimensions on both 'basic' and 'gain' antennas. There is information on hidden and disguised antennas, tuners and baluns, SWR meters, noise bridges, converting any antenna's dimensions to your favorite HF band, and more — much more!

This book's contents are 'user oriented' rather than technical. It features large diagrams and easy-to-read text, and we're confident it will spend more time on your station's desk than collecting dust on your library shelf!

**Order Code BR002**

\$25.00

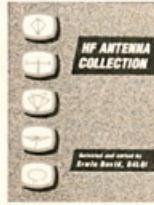
### HF ANTENNA COLLECTION

A collection of the best articles from Radio Communication from 1968 to 1989, and other information useful to the HF antenna builder. Selected and edited by Erwin David, G4LQI, first published in 1991, 180 x 245mm with 233 pages.

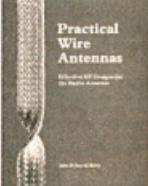
An invaluable collection of outstanding articles and short pieces which were published in the RSGB monthly magazine Radio Communication. As well as ingenious designs for single-element, beam and miniature antennas, there is a wealth of information on ancillary topics such as feeders, tuners, baluns, testing, modelling and the mechanics of mounting an antenna safely. This book could just supply that vital idea for your next antenna project.

Contains nine chapters and six appendices.

**Order code BR391** RSGB ©1991 \$44.00



### PRACTICAL WIRE ANTENNAS



Effective HF antennas for the radio amateur. Practical Wire Antennas from the RSGB by John D. Holt, G3BDO, published in 1989. This book has been written for the non mathematician whose knowledge of this subject has never extended beyond the high school syllabus. It is aimed at anyone who is capable of passing the radio amateur's exam, and the antennas described and illustrated are easy to set up and use successfully. There is additional data which will allow experiments and tests with versions that are cut for other bands or designed to fit into difficult locations. The simplified and easily-understood antenna theory is an attempt to allow the newest recruit to amateur radio to learn something about how simple wire radiators work at HF.

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### EASY-UP ANTENNAS—for Radio Listeners and Amateurs

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This handy reference • Covers basic do-it-yourself antennas for shortwave broadcast, FM broadcast, MW, LW, utilities, for present and prospective amateurs and scanner listeners • Features basic construction procedures for both receiving and transmitting antennas • Includes information on dipole variation, vertical variations, beams, long wires and other special types and configurations • Details proper testing procedures • Discusses advanced antenna designs, including beams, phased elements and other types • Provides information on band frequencies, time considerations and sources of data. 162 pages 210 x 280mm

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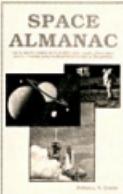
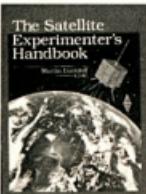
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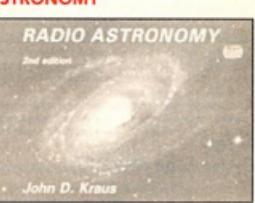
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By Thomas Harrington contains 238 Pages (210x280mm)

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Space exploration by radio is exciting and is open to anyone! Equipped with receivers and transmitters, computers and telescopes, thousands of individuals, schools and clubs are passing everything that goes on in space. Some are communicating via satellites or by bouncing signals off meteor trails or even the moon, some are listening to cosmonauts or taking part in space experiments, while others are listening to radio signals that have taken millions of years to come from distant galaxies.

Space Radio Handbook shows you how it's done, and the equipment you will need. It details the whole field of space radio communication and experimentation, including meteor scatter, moonbounce, satellites and simple radio astronomy. A valuable feature is a collection of experiments of interest to those wishing to explore the many educational possibilities. If you are ready to use radio to explore beyond the atmosphere, let this book be your companion.

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# SATELLITE BOOKS

## Ku-BAND SATELLITE TV Theory, Installation & Repair

By Frank Baylin and Brent Gale

A clear presentation and explanation of worldwide Ku-band satellite television. This fourth edition has been expanded with additional sections on small dishes, European DBS satellite TV, flat plate antennas, actuators, LNB and satellite receiver design, worldwide scrambling technologies, link analyses, fixed antenna installations, interfacing receivers and decoders and aligning a polar mount without a compass.

The book explores the technology of Ku-band television equipment with a detailed survey of frequency allocation for broadcast satellites around the globe. Retrofitting Ku-band components onto C-band TVROs is discussed with a step-by-step examination of multiple-receiver systems and distribution networks. Existing North American, Soviet, European, Japanese and Australian Ku-band broadcast systems are outlined and, finally, a consistent and comprehensive method of troubleshooting and repairing TVROs, detailed description of different types of test equipment.

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## WORLD SATELLITE TV AND SCRAMBLING METHODS

By Frank Baylin, Richard Maddox, John McCormack

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## SATELLITE OFF-AIR & SMATV

By Frank Baylin, Steve Berkoff and Tim Meints

A comprehensive study of satellite master antenna TV (SMATV) systems. This thorough manual clearly presents the concepts behind private cable systems as well as technical details of construction and operation. Private cable systems are installed in apartment complexes, hotels, motels, hospitals, caravan parks and auditoriums, as well as in many other multi-unit environments.

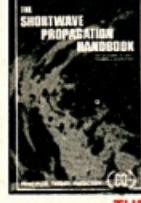
This book explores the background and history of this rapidly-evolving field. Off-air and satellite head ends, and all components from antennas to processing and mixing electronics are studied in detail. The chapter on distribution systems explores the components required to supply a high-quality signal to every television set. Numerous examples are provided as illustrations of each stage of design. Complex design issues such as antenna location, signal levels, signals, two-way services and satellite audio reception are also studied. The chapter on systems operations presents methods to manage one or more systems as well as a logical approach to troubleshooting.

258 pages, 215 x 280mm.

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Fourth edition, 1991. The ARRL Operating Manual is the most complete book about amateur radio operating and propagation. If you're really keen to be 'in' on what is happening in amateur radio today, you need a copy of The ARRL Operating Manual. In the operating awards chapter 88 popular operating awards are described and illustrated in full colour. Other topics covered include: • Short-wave listening • The amateur radio spectrum • Basic operating • Antenna orientation • DXing • Overseas DXing / DXpeditions • Emergency Communications • Image communications • Contests • Operating awards • RTTY communications • Packet radio • FM and repeaters • Satellites • VHF/UHF operating • Reference section, 8" x 11", 1.25 inches thick.

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### RADIO AURORAS

By Charlie Newton G2FKZ Published by the RSGB, 1st Edition 1991, this book tells all you would ever want to know about amateur radio communication by means of auroral propagation. It gives a readable account of what causes auroras, how they are forecast and how to best use them to work DX. There are seven chapters and an index. Chapter titles include: • How an aurora begins • The sun's part • Magnetic fields of the Earth and Sun • How an aurora comes about • The problems of field-aligned propagation • Auroras on bands other than two metres • An analysis of amateur work during Cycle 19 • The big storm of 13/14 March, 1989. This book is a 'must read' for anyone interested in an in-depth study of radio wave propagation.

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### THE SHORTWAVE PROPAGATION HANDBOOK

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The information contained in this book should significantly enhance one's ability to understand and to make better use of the ionosphere. We feel that this book is one of the most useful — and usable — volumes available today on the subject of propagation. 150 x 200mm, 150 Pages

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By Jim Kearman, KR1S

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1993 edition pictured above — 1995 edition is due in stock November 1994

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This new book by G R Jessop, G6JP, was published by the RSGB in 1990. It covers the lifetime years of radio from Marconi to the 'secret listeners' of 1939-45. High quality, hardbound with many photographs and diagrams.

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In May 1914 a small band of radio amateurs lead by the late Hiram Percy Maxim, W1AW and Clarence Tuska started a national organisation and named it the American Radio Relay League. Since that time, the story of amateur radio has been closely identified with the history of the league, the chronicle of amateurs working together. In 1946, the Golden Anniversary of the league, its magazine *QST* covered this tale in serial form. This material is now gathered here as a historical reference, supplementing but not replacing the only other comprehensive history, *Two Hundred Metres and Down* by Clinton B DeSoto, 150 Pages 6" x 9"

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## 200 METERS AND DOWN

THE STORY OF AMATEUR RADIO by Clinton B DeSoto was first published in 1936 by the ARRL. At that time Mr DeSoto, then a radio amateur and a student of journalism, started to do what no one had ever done for amateur radio — to write its full history for the benefit of generations to come. This volume has been reprinted exactly as it was in 1936 and is an invaluable source of amateur history. 6" x 9" 184 pages.

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6AW8A	\$15.32	6JS6C	GE	\$ POA	8950	GE	\$54.36
6AX4GTB	\$15.32	6JS6C	Selected Pr	\$ POA	8981	GE	\$65.37
6AX5GT	\$23.55	6L6GB / GC		\$22.14	3-500Z	RFP Premium	\$237.00
6AX5GTB	\$13.62	6L6GT		\$19.65		Matched Pair	\$499.00
6AZ0	\$29.85	6LB6 Sel Pr	ECG (Galaxy)	\$ POA	3-500Z	EIMAC	\$372.00
6BA6	\$15.32	6LX6		\$44.41		Matched pair	\$79.70
6BE6	\$17.03	6LX8		\$15.32	3-500ZG	Graphite anode	\$275.00
6BK7	\$15.32	6N8		\$30.65		Matched pair	\$574.00
6BL8 / ECF80	\$11.92	6S2A		\$18.73	4-65A	EIMAC	\$229.25
6BM8	\$20.96	6S4A		\$18.73	4-400C	EIMAC	\$419.70
6BN5	\$42.58	6SK7GT		\$37.47	3CX100A5 / 7289	EIMAC / GE / RCAs175.78	
6BN8	\$31.31	6SL7GT		\$20.85	3CX400A7 / 8874	EIMAC	\$941.89
6BQ5	\$14.14	6SN7GTB		\$17.85	3CX800A7	EIMAC	\$890.67
6BQ6	\$15.32	6U8A / 6KD8		\$20.85	3CX1200A7	EIMAC	\$1395.02
6BQ7A	\$20.44	6U9		\$9.60	3CX1500A / 8877	PENTA	\$1518.29
6BY5	\$13.62	6V6GT		\$19.00		EIMAC	\$1754.10
6BZ6	\$15.32	6X4		\$19.07	3CX3000A7	EIMAC	\$1886.27
6C4	\$21.81	6X5GT		\$17.13	4CX250B / 7203	EIMAC	\$269.00
6CA7 / EL34	\$19.65	6X8A		\$20.43	4CX250B / 7203	RFP Czech	\$229.00
6CB6	\$15.32	6X9		\$9.60	4CX300A	PENTA	\$535.57
6CD6	\$30.65	12AL5		\$15.32	4CX350A	EIMAC	\$522.69
6CD7 / EM34	\$89.85	12AQ5		\$15.32	4CX1000A7	PENTA	\$1021.67
6CG8A	\$9.64	12AT7A		\$15.32	4CX1500B / 8660	PENTA	\$1296.90
6CL6	\$30.79	12AU6		\$15.32	KT88	PENTA	\$36.00
6CM5	\$13.62	12AU7A		\$15.32			
6CM7	\$13.62	12AX7A		\$15.32			
6CQ8 / 6UBA	\$15.32	12BA6		\$15.32			
6CS6	\$15.32	12BY7A		\$41.85			
6CS7	\$15.32	12BZ6		\$35.85			
6CW4	\$46.37	12BZ7		\$15.32			
6CW5 / EL86	\$18.73	12DQ6B / 12GW6		\$24.00			
6CW7	\$30.65	12JB6		\$59.85			
6CX8	\$30.65	572B / T160L	RFP Premium	\$120			
6DJ8	\$12.20		Matched pair	\$252.00			
6DQ6 / 6GW6	\$29.87		Matched quad	\$505.00			
6DR7	\$36.68	807	Ceramic Base	\$11.00			
6DS4	\$46.37	810	Cetron	\$235.26			

### TRANSMITTING TUBES

Eimac and Penta Transmitting, Thyratron, and Magnetron Tubes carry manufacturers limited warranty against defective material and workmanship for 12 months. Defective tubes must be returned prepaid accompanied by original purchase receipt and failure report details. Surplus tubes have a 90 day limited warranty.

### TUBE BRANDS

The brands shown in this list are those that were available at the time of printing. Whilst every effort will be made to supply the brands listed, if you have a requirement that only ONE brand is acceptable then please note this condition on your order, otherwise we will assume that substitutes are acceptable.

# R.F. Power transistors & hybrids

VHF/UHF 27-1000MHz

HF (2-30MHz)

RF Power modules

Type	Po W	Freq Range	Gain dB	Package Type	per Each	Matched Pair	Type	Po W	Package Style	Each	Matched Pair	Matched Quad	Part Number	Freq Range	P in mW	P o Class	BIAS inc	Price inc tax
MRF207	1	G	8.2	TO-39	\$8.77		MRF401	25	145A-09	\$38.88			BGY45B	148-174	150	28	C	\$87.50
MRF208	10	G	10	145A-09	\$42.77		MRF405	20	211-07	\$42.51	\$98.49	\$207.35	CA2832	1-200	1	1.6	A	\$142.88
MRF212	10	F	9	145A-09	\$50.54		MRF412	80	211-11	\$57.02	\$150.33	\$309.72	CA2885	40-500	40	2	A	\$162.00
MRF220	4	F	12	211-07	\$36.25		MRF412A	80	145A-10	\$69.98			M57704EL	335-360	200	13	C	\$112.28
MRF221	5	M	6.3	211-07	\$36.25		MRF421	100	211-11	\$64.68	\$139.90	\$284.84	M57704L	400-420	200	13	C	\$112.28
MRF224	40	F	4.5	211-07	\$40.73		MRF422*	150	211-11	\$99.49	\$220.30	\$461.34	M57704M	430-450	200	13	C	\$103.28
MRF226	9	G	14.5	145A-09	\$64.68		MRF426	25	211-07	\$50.54	\$114.04		M57704H	450-470	200	13	C	\$112.28
MRF227	3	G	13.5	TO-39CE	\$19.31		MRF426A	25	145A-09	\$64.80	\$147.73	\$305.03	M57704SH	490-512	200	13	C	\$112.28
MRF229	1.5	E	10	TO-39CE	\$41.47		MRF427**	25	145A-10	\$51.58	\$119.22	\$243.53	M57704UH	470-490	200	13	C	\$112.28
MRF231	3.5	E	10	145A-09	\$69.85		MRF428*	150	211-11	\$145.78	\$280.00	\$575.96	M57706	145-175	200	8	C	\$93.83
MRF233	15	E	10	145A-09	\$41.20		MRF429**	150	211-11	\$116.52	\$258.75	\$543.50	M57710A	156-160	200	28	C	\$83.03
MRF234	25	E	9.5	145A-09	\$84.70		MRF433	12	211-07	\$34.99	\$66.61	\$171.06	M57713	144-148	200	10	AB	\$87.12
MRF237	4	F	12	TO-39CE	\$15.97		MRF445**	250	211-11	\$187.91	\$401.73	\$821.61	M57714	450-470	100	7	C	\$114.53
MRF238	30	F	9	145A-09	\$41.47		MRF449	30	211-07	\$56.32	\$127.00	\$264.37	M57714EL	335-360	100	7	C	\$125.78
MRF239	30	F	10	145A-09	\$44.06		MRF449A	30	145A-09	\$56.32	\$127.00	\$264.37	M57714M	430-450	100	7	C	\$114.53
MRF240	40	F	9	145A-09	\$47.95		MRF450	50	211-09	\$33.47	\$80.35	\$165.88	M57714UH	470-490	100	7	C	\$125.78
MRF240A	40	F	9	211-07	\$47.95		MRF450A	50	145A-09	\$36.95	\$84.23	\$173.65	M57715	144-148	200	10	C	\$102.25
MRF245	80	H	6.4	316-01	\$77.44	\$191.79	MRF453	80	211-11	\$44.06	\$102.38	\$251.12	M57716	420-450	200	10	AB	\$163.35
MRF247	75	F	7	316-01	\$77.64	\$171.06	MRF453A	60	145A-10	\$47.95	\$119.22	\$222.90	M57719N	142-163	200	10	C	\$104.00
MRF248	80	F	11.3	316-01	\$111.97	\$253.22	MRF454	80	211-11	\$36.17	\$86.83	\$154.59	M57721M	400-450	100	7	C	\$120.83
MRF250	50	F	4.4	316-01	\$61.57		MRF454A	80	145A-10	\$51.72	\$129.48	\$258.92	M57726	144-146	200	40	C	\$159.75
MRF260	5	F	10	TO-220CE	\$29.81		MRF455	80	211-07	\$28.39	\$61.71	\$129.48	M57727	144-148	200	25	AB	\$127.05
MRF261	10	M	5.2	TO-220CE	\$37.58		MRF455A	80	145A-09	\$39.09	\$98.67	\$152.92	M57729	430-470	600	25	C	\$169.40
MRF262	15	M	6.3	TO-220CE	\$37.58		MRF458	80	211-11	\$46.54	\$123.87	\$258.81	M57732	144-175	20	7	AB	\$69.63
MRF264	30	M	5.2	TO-220CE	\$40.03		MRF460	80	211-11	\$60.91			M57735	135-160	20	7	AB	\$69.63
MRF309*	50	H	7	316-01	\$121.18		MRF464*	80	211-11	\$64.80	\$150.33		M57737	144-148	200	17	AB	\$148.39
MRF314*	30	D	10	211-07	\$75.16	\$180.13	MRF464*	80	211-09	\$82.30	\$181.06		M57739C	82-851	30	6	C	\$111.94
MRF315*	30	D	9	211-07	\$95.33	\$206.05	MRF467*	40	211-09	\$82.30	\$181.06		M57741L	148-160	200	25	C	\$137.95
MRF315A*	30	D	9	145A-09	\$255.96		MRF475	12	TO-220	\$20.60	\$64.16		M57741H	164-275	300	25	C	\$145.20
MRF317*	80	D	10	316-01	\$181.33	\$388.51	MRF475*	3	TO-220	\$20.62	\$61.52		M57744	905-915	400	13	C	\$143.89
MRF317*	100	D	9	316-01	\$167.69	\$368.04	MRF477	40	210-220CE	\$45.14	\$76.46		M57745	430-450	300	25	C	\$117.40
MRF321*	10	I	12	244-04	\$69.33		MRF477*	40	210-220CE	\$45.14	\$76.46		M57747	144-148	200	13	C	\$93.94
MRF327	80	H	7.3	316-01	\$160.63	\$336.94	MRF479	15	TO-220CE	\$48.73	\$106.26		M57755	806-866	100	20	C	\$121.96
MRF340	8	D	13	TO-220CE	\$38.50		MRF485*	15	TO-220	\$36.17			M57759	890-915	2	0.2	C	\$71.40
MRF492	70	C	11	211-11	\$38.76	\$88.12	MRF492	90	211-11	\$38.76	\$88.12	\$196.98	M57762	1240-1300	1000	20	AB	\$170.89
MRF497	40	C	10	TO-220CE	\$43.95	\$92.01	MRF492A	90	145A-10	\$59.61	\$136.07	\$285.10	M57764	806-825	400	20	C	\$163.69
MRF515	75	J	8	TO-39	\$7.52		MRF493	12	211-11	\$58.50	\$124.88		M57782	135-160	50	7	AB	\$103.39
MRF555	1.5	J	10	317-01D	\$12.21		SD1405	75	211-11	\$58.70	\$76.85	\$162.14	M57785L	135-160	50	7	AB	\$136.69
MRF557	1.5	K	8.0	317-02/2	\$14.26		SD1407*	100	211-11	\$105.00	\$242.00		M57787	1240-1300	7	1.5	C	\$125.89
MRF559	0.5	K	8	317-01	\$7.07		SD17395	90	211-11	\$38.72	\$89.54	\$174.24	M57788H	430-470	400	45	C	\$222.53
MRF607	1.75	F	11.5	TO-39	\$7.07		SHF3800	110	211-11	\$43.95	\$101.71	\$222.64	M57788M	430-450	400	45	C	\$229.55
MRF627	.5	J	10	3054-01	\$42.62							M57796MA	144-148	200	7	AB	\$69.64	
MRF629	2	J	8	TO-39CE	\$19.31							M67705M	430-470	20	5	C	\$96.56	
MRF630	3	J	9.5	TO-39CE	\$19.31							M67705H	470-512	20	5	C	\$96.56	
MRF641	15	J	7.8	316-01	\$56.90	\$124.41						M67711	1240-1300	1000	16	AB	\$154.58	
MRF644	25	J	6.2	316-01	\$64.80							M67715	1240-1300	10	1.5	A	\$125.89	
MRF646	40	J	4.8	316-01	\$71.92							M67727	144-148	500	60	AB	\$260.89	
MRF650	-	I	-	316-01	\$84.70							M67748L	135-150	20	7	AB	\$85.28	
MRF648	60	J	4.4	316-01	\$87.34	\$186.61						M67755L	134-150	20	7	AB	\$106.99	
MRF652	10	J	10	244-04	\$41.59							M67781L	135-160	400	45	C	\$193.28	
MRF653	10	J	7	244-04	\$51.72							M67796	1240-1300	10	1.5	C	\$POA	
MRF654	15	J	7.8	244-04	\$55.93							MHW590	10-400	1	0.9	A	\$128.67	
MRF659	7	J	5.4	TO-220AD	\$36.29							MHW591	1-250	1	0.7	A	\$101.64	
MRF672	8	J	6	245-05	\$12.20							MHW592	1-250	1	0.7	A	\$112.89	
MRF754	8	J	6	249-05	\$125.71							MHW710-1	400-440	250	15	C	\$147.62	
MRF843	15	K	7	244-04	\$90.71							MHW710-2	440-470	250	15	C	\$147.62	
MRF843F	15	K	7	319-04	\$147.73							MHW710-3	470-512	250	15	C	\$147.62	
MRF846	40	K	7	319-04	\$116.63							MHW710-4	510-550	250	15	C	\$121.00	
MRF873	15	K	7	319-04	\$142.43							SUA4	340-450	200	10	AB	\$120.00	
MRF1946	30	F	10	145A-09	\$44.06							SUV6	154-162	200	28	C	\$121.00	
MRF2628	15	G	12	244-04	\$33.67							SUV7	144-148	200	28	C	\$103.00	
SD1278-1	40	F	8	211-07	\$41.60							SAV12	144-148	150	5	C	\$56.87	
SD1441	150	F	5	316-01	\$232.70							SAV17	144-148	400	50	C	\$149.00	
SD1477	100	F	6	316-01	\$194.87							SAV24	144-148	400	50	C	\$163.80	
SN3553*	2.5	F	10	TO-39	\$8.45													
SN3866*	1	H	10	TO-39	\$3.24													
SN4427	1	F	10	244-05	\$5.03													
SN4546*	10	J	6	244-04	\$51.50													
SN5944	2.0	J	9.0	316-01	\$36.29													
SN5945	4	J	6	316-01	\$20.20													
SN5946	10	J	6	244-04	\$51.50													
SN6080	4	F	12	145A-09	\$37.21													
SN6081	15	F	6.3	145A-09	\$36.05													
SN6082	25	F	6.2	145A-09	\$37.21													
SN6083	30	F	5.7	145A-09	\$37.21	\$84.23												
SN6084	40	F	4.5	145A-09	\$36.29	\$84.23												
SN6977 PNP	40	F	-	145A-09	\$77.58													
SN6255	3	F	7.8	TO-39	\$12.53													

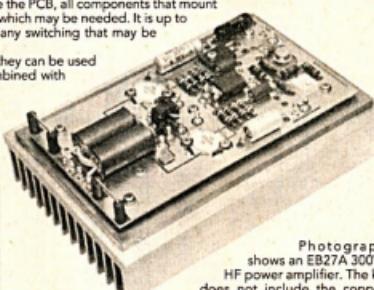
# for the home brewer...

## Motorola app note POWER AMPLIFIERS - short form kits

These RF power amplifier kits offer a wide range of amplifiers in short form kits. All of these kits include the PCB, all components that mount on the PCB, the active devices and any necessary unusual wire such as high temperature enamel or Teflon which may be needed. It is up to the builder to provide heat spreading, heat sinking, forced air cooling, connectors, output filtering and any switching that may be necessary.

All of these amplifiers are linear units with any necessary bias stabilisation provided on the PCB, thus they can be used in any desired mode including CW, SSB or FM. When used well below their maximum ratings and combined with appropriate filtering they are eminently suited to testing applications.

Applications for these kits include amateur, commercial or instrumentation HF amplifiers, FM broadcast amplifiers and drivers and amateur or commercial VHF amplifier systems.



Photograph shows an EB27A 300W HF power amplifier. The kit

does not include the copper heat spreader plate or the heatsink.

All other components, including pre-wound and assembled transformers are included in all of the kits. Individual components and selections of parts are available for all models, please enquire for details. All of these kits are strictly in accordance with the original Motorola application notes with additional details and assembly notes included where necessary. Only top quality components and materials are used in assembling these kits!

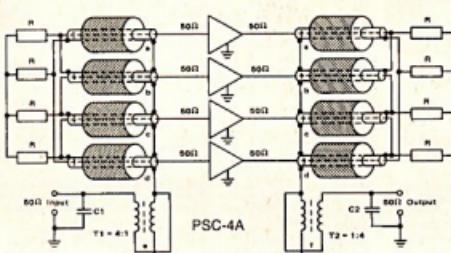
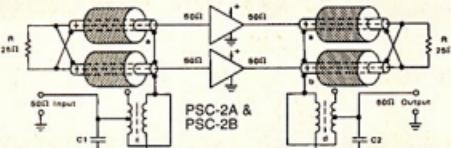
Application Note	Frequency Range	Power In	Power out	DC Supply	Devices used	Price inc tax
AN779L	1.6-30	+8 dbm	20W	12.5V@5A 2 x MRF475	\$201.00	
AN779H	1.6-30	-10 dbm	20W	12.5V@5A 2 x MRF476	\$224.00	
EB63	2-30	1.5 W	140W	13.6V@22A 2 x MRF433	\$213.00	
AN762	1.6-30	1.5W	140W	13.6V@30A 2 x MRF454	\$224.00	
EB27A	2-30	18-20W	300W	28V@20A 2 x MRF422	\$334.00	
AN758	2-30	15-18W	300W	50V@14A 2 x MRF429	\$391.00	
EB104	2-30	6W	600W	40-50V @ 18-20A	2 x MRF150	\$1,064.00
AR313	10-150	15W	300W	12-28V @ 22A typ	MRF141G	\$920.00
AR305	10-175	15W	300W	40-50V @ 12-15A	MRF151G	\$920.00

### High Power splitter / combiners

In the mid-1970's Motorola released an application note, AN-749, by Helge Granberg with details of the design of hybrid power splitters and combiners for HF use. These three types are produced to Granberg's original designs and have been successfully used in many applications over the years.

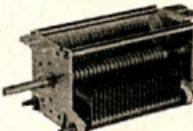
Careful construction using uncommon materials is necessary to ensure the best possible performance from combiners such as these, for this reason all types are supplied complete assembled and tested. Whilst provision is made for power ballasting resistors they are not fitted. See Motorola RF Devices data book, Vol 2, pp 7-98 — 7-106 for more details.

Type Number	Application Notes	Power Rating	Price inc tax
PSC-2A	Motorola AN749	600W PEP	\$168.00
PSC-2B	AN758	1000W PEP	\$192.00
PSC-4A		1200W PEP	\$216.00



### Transmitting Capacitors

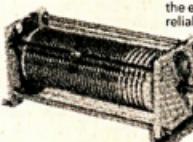
High quality capacitors for linear amplifiers are hard to find, but now you can use these top quality MFJ capacitors in your own projects at realistic prices!



Stock Number	Value pF	Depth	Power Rating	Used in	Price inc tax
CH48	300 pF	45 mm	300 W	MFJ-901	\$24.00
CH49	245 pF	267 mm	3 kW	MFJ-989	\$79.20
CH50	250 pF	280 mm	3 kW	MFJ-986	\$96.00
CH51	250 pF	165 mm	1.5 kW	MFJ-982	\$58.00

### High Power roller inductors

These high performance roller inductors are the same as those used in the MFJ antenna tuners across the entire HF spectrum. They are extremely robust and reliable units for any home-brew application.



Stock Number	Power Rating	Used with	Used in	Price inc tax
CG297	3 kW	CH49	MFJ-989C	\$128.40
CG298	3 kW	CH50	MFJ-986	\$146.70

### Broadband ferrite transformers



Stock Number	Core Length	Price inc tax
TC43	6mm	\$7.20
TC44	13mm	\$7.80
TC45	19mm	\$9.00
TC46	25mm	\$9.00
TC47	32mm	\$10.20

### High Power splitter / combiners



Stock Number	Type	Core (mm)	Power PEP	Price inc tax
TC48	Input	6x13	70W	\$7.20
TC49	In/Output	13x13	300W	\$9.00
TC50	Output	6x29	1500W	\$10.80
TC51	Output	13x29	2500W	\$11.88

# Coax connectors and cable...

## BNC clamp style cable male



**PC34** \$3.60

Standard clamp connector for RG58 style 50Ω cable

**PC35** \$3.60

Standard clamp connector for RG59 style 75Ω cable

**PC36** \$6.78

Square cut (easy assembly) cable plug for RG58 75Ω

**PC37** \$6.78

Square cut (easy assembly) cable plug for RG59 75Ω

**PC38** \$26.11

Standard clamp plug for RG178 submin 50Ω cable

**PC158** \$8.28

Standard clamp plug for RG174 submin 50Ω cable

## BNC clamp type for large cables



**PC171** \$6.35

Clamp cable male for RG123 and similar 50Ω cable

## BNC Crimp type cable male



**PC39** \$5.94

Crimp plug for RG174/179 submin 50Ω cable

**PC40** \$3.18

Crimp plug for RG58 style 50Ω cable

**PC42** \$2.76

Crimp plug for RG59 & RG62 cable with captive contact

**PC156** \$3.90

Crimp plug for RG174 submin 50Ω cable

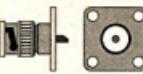
## BNC bulkhead mount male



**PC129** \$9.36

Single hole mount male

## BNC flange mount male



**PC136** \$6.60

Small flange male

## BNC clamp type cable female



**PC28** \$4.45

Standard clamp cable female for RG58 style 50Ω cable

**PC29** \$5.98

Standard clamp cable female for RG59 75Ω style cable

## BNC crimp type cable female



**PC999** \$

Free female for RG58 style 50Ω cable

## BNC bulkhead clamp female



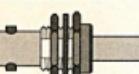
**PC30** \$5.78

Clamp type bulkhead female for RG58 style 50Ω cable

**PC31** \$5.35

Clamp type bulkhead female for RG59 style 75Ω cable

## BNC bulkhead crimp female



**PC33** \$5.62

Crimp type bulkhead female for RG59 & RG62 type cables

**PC170** \$5.66

Crimp type bulkhead female for RG58 style 50Ω cables

## BNC bulkhead mount female



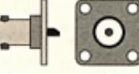
**PC24** \$2.28

Bulkhead mount female for thin panels

**PC25** \$5.46

Bulkhead mount female for thick panels

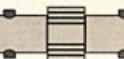
## BNC flange mount female



**PC32** \$3.80

Standard flange mount female

## BNC in-series adaptors



**PC44** \$3.02

Female-female adaptor



**PC106** \$5.62

Female-female bulkhead mount adaptor

**PC107** \$6.54

Female-female bulkhead mount adaptor, insulated



**PC43** \$9.07

Male-male adaptor



**PC45** \$8.76

BNC F-M-F tee adaptor

## TNC cable male connectors



**PC151** \$2.81

Standard clamp male for RG58 style 50Ω cable



**PC161** \$3.66

Crimp type cable male for RG58 style 50Ω cable

## TNC female connectors



**PC175** \$3.32

Bulkhead female



**PC176** \$5.65

Plunge female

## Type N clamp type cable male



**PC54** \$6.50

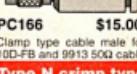
Clamp type cable male for RG58 style 50Ω cable



**PC53** \$8.50

Clamp type cable male for RG213 style 50Ω cable

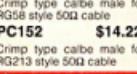
## Type N crimp type cable male



**PC166** \$15.00

Crimp type cable male for 100-FB and 9913 50Ω cable

## Type N flange mount male



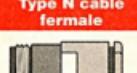
**PC137** \$5.16

Crimp type cable male for RG58 style 50Ω cable

**PC152** \$14.22

Crimp type cable male for RG213 style 50Ω cable

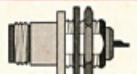
## Type N cable female



**PC169** \$10.20

Clamp type cable female for RG213 style 50Ω cable

## Type N bulkhead female



**PC56** \$6.48

Standard single hole female

**PC52** \$26.92

Single hole mount for .44in, hole size same as BNC connector

## Type N flange female



**PC57** \$6.54

Standard flange mount female

## UHF connectors



**PC17A** \$3.12

Teflon insulated cable plug for RG-213 size cable.



**PC18** \$0.42

reducer sleeve for RG58.



**PC19** \$0.42

reducer sleeve for RG59.



**PC16** \$3.54

Four hole flange mounting socket.



**PC22** \$4.26

Female - male adaptor or joiner.



**PC20** \$10.37

Female - male - female TEE adaptor.



**PC23** \$2.27

Male - male adaptor or joiner.

## CO-AXIAL CABLE

A comprehensive range of co-axial cable for all your RF needs, three types of subminiature for internal and instrumentation use, standard sizes in three impedances for communications, television and computer use, semi-rigid types for microwave use and low loss cable for long runs at VHF and UHF in communications installations. Note that the low loss types, 9913 style and 10DFB cables both use special connectors, enquire for details. Connectors for semi-rigid cable are stocked in SMA and type N.

Stock Number	RG type	Z <sub>o</sub> Ω	Loss db/100m @ 400MHz	Price per mtr
<b>Subminiature PVC insulated</b>				
WB36	RG174	50	65.6	\$1.32
<b>Subminiature TEFLON® insulated</b>				
WB37	RG178	50	95.1	\$2.69
WB35	RG179	75	68.9	\$4.56
<b>Semi-Rigid TEFLON® insulated</b>				
WB57	RG400 .085"	50	34	\$14.93
WB56	RG402 .141"	50	21	\$14.93
<b>Standard style PVC insulated</b>				
WB38	RG58	50	33.1	\$1.02
WB54	RG213	50	15.4	\$2.76
WB70	9913	50	8.9	\$4.99
WB71	10DFB	50	6.8	\$7.92
WB39	RG59	75	23	\$1.44
WB41	RG62	93	17.4	\$1.14

# Why not a Ten-Tec?

TEN-TEC



The SCOUT from Ten-Tec gives you full QSK CW operation, superb quality SSB and all the features you need in a compact single band transceiver. BUT you only need to change a small band module to add other bands, pull one out, plug another in, it's that simple. All amateur bands are available from stock for the SCOUT.

**SIMPLICITY:** For either CW or SSB you just sit down and operate! Master your new radio in only minutes — every feature is right on the front panel making this radio so easy to use it will absolutely amaze you!

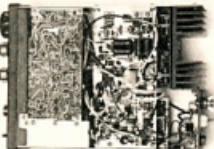
**SIZE:** At half the size of other small transceivers and with much lower power consumption the SCOUT makes mobile and portable operation supremely simple! It's 64H x 184W x 248D size and 2.4kg weight tell the story.

**SELECTIVITY:** The revolutionary, patented "Jones" filter results in a variable bandwidth 8 pole crystal filter from 500Hz to 2.5kHz at the turn of a knob. No CW filters or optional SSB filters, they are all in the box already!

**SMART:** Add to all of this a state-of-the-art RISC processor which provides synthesizer-like performance with continuous tuning and crystal stability with the exclusive FLS frequency locking system. It also provides built-in 5-50wpm Iambic keying and an easy to read digital display.

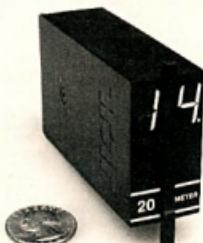
**POWERFUL:** The 50 watt output power of the SCOUT is enough to work the world but saves on battery power. Less than 10A required for full output, <4.5A for SWR output and on receive it only needs 600mA.

The SCOUT is just like every other product in the Ten-Tec range. Painstakingly designed and carefully built to an extremely high standard with the highest quality components in the USA. In these photographs you can see that the SCOUT might be small but is built to last through many years of tough service.



Part of the success of the SCOUT is the simple band module, shown here with an American quarter (a bit larger than a 10 cent piece) the module removes all of the expense and complication of band switching from the radio, simply pull out one and plug in another!

Adding to all of the great features from Ten-Tec is the support you will get from DAYCOM, we have full facilities for warranty and non-warranty service of Ten-Tec radios, amplifiers and accessories. All Ten-Tec accessories for the SCOUT are carried in stock.



## TT-555

SCOUT 555 with one band module of your choice

# \$1199

Band modules for SCOUT

160, 80, 40, 30, 20, 17, 15, 12 or 10metres, each  
TT-607 Single paddle key for SCOUT or OMNI-VI  
TT-700C Electret hand mic for SCOUT or OMNI-VI  
TT-705 Desk mike, coiled cord for SCOUT or OMNI-VI

\$62  
\$93  
\$87  
\$192



Arguably the best transceiver ever built for strictly amateur band use — the TEN-TEC OMNI-VI is the culmination of two decades of high performance transceiver engineering. Designed to meet the needs of the serious DX'er and contester the crystal mixing scheme used in the OMNI-VI virtually eliminates phase noise as a factor in receiver performance.

**SELECTIVITY:** In one area where the OMNI-VI excels, with up to 24 poles of cascaded filtering and Passband Tuning, adjustable noise blanker, DSP low pass audio filters and DSP notch filters as well as a manual notch filter the OMNI-VI has a formidable arsenal of interference rejection capability.

Super high performance microprocessor control gives lightning fast QSK for CW, AMTOR & PACTOR, adjustable slow QSK delay, Dual VFO's, ±10kHz RIT and XIT, clock, Iambic keyer, 100 memories and scratch pad with four flexible memory use options as well as flexible frequency entry options, band stacking registers and all of the features you need for serious HF operation.

All TEN-TEC equipment is made in the USA from top quality components and carries a full 12 month warranty. Call for brochures giving complete details or call-in for a try-out today!

## TT-563

OMNI-VI Amateur band only transceiver

# \$5200

## OTHER TEN-TEC MASTERPIECES



**DELTA-II** - A full high performance 100W transceiver fully synthesised for all amateur bands plus general coverage receive. Has VOX, speech processing, CW-QSK, Jones IF filter, Notch filter, Passband tuning and clock all in a package smaller than most "smile" HF transceivers. \$3400

**ARGONAUT-II** - In all respects identical to the DELTA-II but with 5W maximum output requires only 750mA receive and 3A transmit. \$3100



**PARAGON-II** - A fully featured, fully synthesised HF radio for all band coverage with general coverage receive, feature packed! Call for brochure \$5200



**HERCULES-II** - A muscle bound 500W output no-tune solid state amplifier for 1.8-30MHz. Lightning fast QSK, and remote control are standard. Needs 80A @ 13.5VDC. \$3120



**CENTURION** - A full throttle 2kW DC input linear with a pair of 3-500Z EIMAC tubes. Produces 1300W PEP SSB, 1000W CW and 650W RTTY & SSTV. With 50Hz rated power supply \$4200



**TITAN** - The ultimate HF linear, a pair of 3CX800A7 EIMAC tubes, with full QSK requires 60-80W drive for 1500 watts output. Fully protected with ducted forced air cooling using centrifugal blower for low noise. \$7400

# ICOM Ham Heaven!

ICOM has the products that make amateur radio fun, DAYCOM has the service to make it easy! Our new air-conditioned showroom has extensive demonstration facilities for HF, VHF and UHF including all digital modes. You are welcome to 'audition' any ICOM product with accessories of your choice. Full technical support is available on the premises.



IC-781: That which many aspire to but which few will attain, the best in HF radios!



IC-765: HF performance with built-in ATU and power supply at an affordable price



IC-736: All the features of the latest HF technology with built-in power supply, automatic antenna tuner AND a full 100W on 6 metres.

IC-738: Combines the performance features of the IC-736 with the convenience of 13.8V operation (no 6 metres)



IC-728: The basic HF transceiver with 26 memories, Pass-band tuning and great performance!

IC-729: Just like the IC-728 but with six metres.

## TRADE-INs

Your clean used equipment is always welcome as a trade-in. Please contact us for valuations.



IC820H: Superb performance in a dual band (2m/70cm) all-mode transceiver for voice, satellite or packet.



IC970H: Deluxe 2m/70cm multi-mode base station with power supply, can have 23cm, 13cm and 25-950MHz receiver added. Satellite features built-in.



IC275H, 475H, 575H: The definitive mon-band multi-mode radios, still going strong.



IC-2700H: Icom's best mobile ever with remote mount front panel and optional infra-red remote control.



IC-R7100: 25-2000MHz receiver with computer remote control, keypad entry and great overall features for commercial or serious listener use.



IC-R72A: 30kHz-30MHz receiver.



IC-2B1H, 481H: 2m and 70cm mono-band mobiles with cross band receiver, full duplex cross band operation and 9600bps packet ready.

IC-2340H: 2m/70cm dual-band, same styling as IC-281H but for two bands.

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**NEW 3 year warranty** available on any ICOM transceiver or receiver.

Packet and multi-mode control setup service available with any ICOM transceiver.

CALL for detailed information and prices on all ICOM equipment!

# KENWOOD

## HF TRANSCEIVERS



TS-950SDX 150W Tx/Rx, ATU,PS, DSP



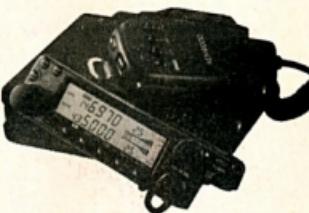
TS-850SAT 100W TX/RX,ATU,100mems



TS-450SAT 100W Tx/Rx, ATU, 100mems

TS-690S 100W HF/50W 6mtr no ATU

## VHF/UHF Mobile



TM-732A 2m/70cm 50/35W Dual



TM-742A 2m/70cm+optional band mobile

## RECEIVER



R-5000 .1-30MHz 100mems

## HF Mobile TRANSCEIVERS



TS-50S 100W TX/RX compact mobile

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We'll gladly trade-in your clean  
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**KENWOOD** equipment

This catalogue lists many of the communications products stocked by Daycom Communications Pty. Ltd. It is by no means complete.

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**OVERSEAS BUYERS** - We will happily ship goods outside Australia. All prices shown here include Australian Sales Tax which you don't need to pay. Please enquire for a firm price and freight quote before you order.

73's from Stewart, VK3ESD and John, VK3ZJF

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## Book Review

# The ARRL Antenna Book

(17th Edition)

Edited by R Dean Straw

Published by ARRL 1994

ISBN: 0-87259-473-4

Paperback 736 pages, 277 mm by 208 mm, plus a 1.44 MB disk.

Reviewed by Evan Jarman VK3ANI

This is a new edition of the ARRL antenna handbook, one of the most read books in amateur literature. You know, from previous editions, what to expect before opening it. This is one of the benchmark publications of any amateur's library. The only question to ask is, how do you improve a good book?

Antenna theory and practice is common to all facets of amateur radio. It is the area where improvements can be made to a station by a "home brewer", without specialised equipment. Also, the changes can be dramatic, with less effort than in other areas. It is the area of greatest interest to amateurs. It is also the most diverse. An ideal area for a reference book.

This edition concentrates on the practice of antenna construction starting from the basis of antenna type. There are fifteen chapters, each concentrating on a particular antenna type. They are Loop, Limited space, Multiband, Multilevel, Broadband, Log periodic, HF Yagi, Quad, Long wire and Travelling wave, Direction finding, Portable, Mobile and Maritime, Repeater systems, and VHF/UHF and Space communications. These are broad topics ensuring that every commonly, and most uncommonly, used antenna is described. Each is dealt with in a pragmatic style. Mathematics is kept to a minimum to make it easier to read. Areas such as log periodic arrays require knowledge of what a logarithm is and they do use the occasional inverse trig function. Where used, complex numbers (eg impedance) are resolved into real (eg resistance) and imaginary (eg reactance) components. These are handled separately to simplify understanding.

The new edition contains changes in most chapters. One, the chapter on HF Yagis, has been completely re-written. The section on performance optimisation is very good. It starts with the design goals, then examines the effect of changing dimensions, and concludes by examining a large number of designs. This allows the reader to design a Yagi either from scratch or by using one of the set designs.

This edition also contains a 1.44 MB floppy disk of computer software. It is for

IBM/C personal computers using DOS. There are programs on gamma match design, element taper, propagation, transmission lines and Yagi design. The programs are generally text display and the program on elevation is of use only in the USA. The gems in the software are the Yagi programs, in particular the Yagi analyser. The program allows you to go through the optimisation of a Yagi described in the book, at the touch of a button. It includes a library of designs to choose from. The display is graphical (and well done) using a EGA/VGA monitor. However, it can be modified for Hercules or CGA. It is a good example of a program that is easy to use and easy to interpret.

The emphasis in the book appears to be on practical understanding. It is a reference book. There is an enormous amount of material. Years of experience from many sources. Each of the chapters makes liberal use of diagrams, graphs, tables and photographs. This makes it easy to understand what is being described. It was easy to quickly understand the principles of the

"Telerama" even though I had never heard the name before.

Using the index, it was easy to locate all my favourite topics. They had all the detail required. Many had references to other articles, for further study. All the topics that I could think of were included. The one topic that I felt should not have been included, was not. That particular antenna is still referred to in some magazines even though it has been described in technical literature as "a waste of good coax". The job of sifting wheat from chaff is protracted and obviously still done. It is always reassuring to know that you can rely on this book as authoritative.

The first edition that I purchased was very long on theory, particularly transmission line. This edition has concentrated more on the practice. The change has not been radical, more evolutionary. Theory is included to balance the how with the why, but does not dominate.

The chapters on ancillary topics are still included. They are Safety first, Ground effects, Antenna selection, Transmission lines, Coupling transmitter to the line, Measurements and Smith chart calculations. All have the detail that one expects of the book.

This is a new edition of an old favourite. It has been one of the best references in the past. The editor has incorporated change and kept the book as an authority as technology improves. The publishers clearly want this book to continue as the definitive reference in the amateur's library. ar

## WIA News

### Boost to SMA Liaison

Liaison with the SMA at Federal level will encompass a more cohesive team approach following a decision of the WIA Federal Council at its October quarterly meeting.

The principal SMA Liaison team now consists of Federal SMA Liaison Officer, Gavan Berger VK1EB (appointed at the Federal AGM in May), Federal President Neil Penfold VK6NE, and Federal Vice Chairman Roger Harrison VK2ZRH. For particular meetings where specific knowledge or expertise is required in given areas of the hobby, other people will be called on to participate in meetings with the SMA.

While SMA liaison has, in the past, been conducted with several WIA people occasionally present at various meetings, this new approach is expected to improve communication between the SMA and the WIA and keep the Federal Council more closely associated with activities and negotiations. Federal President Neil Penfold was to seek a team meeting with the SMA Spectrum Manager, Christine Goode, and other senior SMA staffers at the earliest available opportunity with a view to outlining general agendas, issues and approaches for future meetings. It was hoped that this could be done in early December.

# Contests

Peter Nesbit VK3APN\* Federal Contest Coordinator

## Contest Calendar Dec 94 — Feb 95

Dec 2/4	ARRL 160 m Contest	(Nov 94)
Dec 10/11	ARRL 10 m Contest	(Nov 94)
Dec 26 to Jan 28	Ross Hull VHF/UHF Contest	(Nov 94)
Dec 31	Canada Winter Contest	(Nov 94)
Jan 1	ARRL Straight Key "Night"	
Jan 7/8	ARRL RTTY Roundup	
Jan 14/15	VHF/UHF Field Day	
Jan 14/15	HA DX CW Contest	
Jan 27/29	CQ WW 160 m DX Contest	
Jan 28/29	UBA Belgium SSB DX Contest	
Feb 11/12	PACC CW/SSB DX Contest	
Feb 11/12	Spanish RTTY Contest	
Feb 18/19	ARRL DX CW Contest	
Feb 24/26	CQ 160 Metre SSB Contest	
Feb 25/26	RSGB 7 MHz CW Contest	
Feb 25/26	UBA Belgium CW DX Contest	

Well, it's hard to believe another year is almost over. Last January, my plans for the year included converting the rig to full QSK, putting up a phased array, finishing a home brew SSB linear, getting started on packet, tracking down some local power line noise, and maybe even writing an article or two for *Amateur Radio* in my remaining "spare time". All this was to be achieved within the constraints of a 60+ hour job, a part-time masters degree, and normal domestic duties! It should be no surprise that the aforementioned tasks remain as intact as ever, and show no signs of abating for some time yet.

Unfortunately, these things have kept me off air more than I would have liked, to the extent of even missing some good contests. However, it's simply a result of priorities, in which family, job, and study are given precedence over the hobby of radio.

I remember visiting a ham years ago, who was renowned for his ability to work DX. He had a large rural property, covered with enormous beams, and would be exchanging S6 reports with DX stations long after they had disappeared into the noise for everyone else. He was on for hours every day, working long path, short path, and every other path imaginable. As I trudged up the side drive, marvelling at the antennas, I was startled by a bark from the kitchen window "HE'S UP THE BACK!" Somewhat taken aback, I attempted to exchange pleasantries, but to no avail, so I continued on to the shack where a very pleasant evening was spent chatting about DX, antennas, rigs, and so on.

On the way home, I was troubled by my inability to reconcile the image of my

friend as a top DXer, envied by all, with that of someone whose domestic atmosphere fell somewhat short of Utopia. Perhaps I had arrived on a bad day, or maybe I was reading too much into the event, but it did remind me of the sort of hostility I had witnessed in other households where amateur radio had all but taken over. From that point on, I vowed to always try and keep a healthy balance between amateur radio and other responsibilities of life, even if it sometimes meant skipping the occasional DX operating or contest.

With the Christmas holidays approaching, and the chance to catch up on projects and spend more time on air, let's not overlook the family. As each year passes, those close to us get older, fall sick, or become less accessible one way or another. By all means nurture the on-air friendships, but don't forget that at the end of the day we are just simple human beings, with a need to give and receive companionship with those we love. We are here for so little time, let's make the most of it while we can. The DX will be there tomorrow!

Merry Christmas to all of our valued readers.

Thanks to VK3KWA, LA4YW, The Radio Amateur Club of Canada, CQ, QST, and *Radio Communications*. Until next month, good contesting!

73, Peter VK3APN

## Contest Details

The following contest details are supplemented by the "General Rules & Definitions" published in April 1993 *Amateur Radio*.

## Canada Winter Contest

Dec 31, 0000z to 2359z Saturday

Amateurs worldwide are invited to join this yearly contest, sponsored by the RAC. Categories are: single operator single band, all band, or all band QRP (5W O/P); and multioperator. There are no single mode categories. Use 160-2 m, CW or phone (SSB, AM, FM etc.). On CW try 25 kHz up on the half hour, and on phone 1850, 3775, 7075, 7225, 14175, 21250, 28500. Any station can work any other for credit. For each Canada QSO score 10 points, and each non-Canada QSO 2 points. QSOs with official Canadian RAC stations are worth 20 points (RAC suffix). Note that CW and phone QSOs must be made in the appropriate sub-band to be valid (I expect 160 m is exempt from this rule, due to the absence of coordinated international sub-bands).

Canadians will send RS(T) + province, all others (incl VE0) will send RS(T) + serial. Multipliers (max 12) are counted once per band and mode (ie 12 on 160 m SSB, 12 on 160 m CW, 12 on 80 m CW etc). Provinces are listed later in this column. Final score equals total points x total multiplier. Send logs to "RAC, Box 356, Kingston, Ontario, K7L 4W2, Canada" by 31 January 1995.

## ARRL Straight Key "Night"

Jan 1, 0000z to 2400z Sunday

This is a yearly activity period on New Year's Day, for stations using a straight key. It is not a contest, there are no serial numbers, and ragchewing is encouraged. US stations usually congregate 60-80 kHz up from the band edge. Use "SKN" instead of RST in the exchange, to indicate to other stations you are using a straight key. Send a list of stations worked plus your vote for best fist heard, most interesting contact etc, by 8 January to: "ARRL SKN", 225 Main Street, Newington, CT, USA 06111.

## ARRL RTTY Roundup

Jan 7/8, 1800z Saturday to 2400z Sunday

The object is to contact as many local and overseas stations as possible on Baudot RTTY, ASCII, AMTOR, and packet (attended). More than one digital mode may be used, but QSOs and multipliers are counted once only regardless of mode. The bands allowed are 3.5-30 MHz, on frequencies recommended for digital operation (no 10, 18 or 24 MHz). Categories are: single operator all band (1) max 150 W O/P, (2) more than 150 W O/P; multi-operator single transmitter all band. A maximum of 24 hours operating time is permitted out of the 30 hour contest period. At least two separate rest periods must be taken, each at least 15

minutes long, with the on and off times clearly marked in the log. Listening time counts as operating time.

Exchange signal report and QSO number. W/VE stations will send signal report and state/province. Score one point per QSO. A station may be worked once per band for points credit. The multiplier is the total US states worked (except KH6 & KL7), Canadian provinces (including VE8 & VY1), and DXCC countries (except USA and Canada). KH6 and KL7 count as countries. Multipliers are counted once overall, not once per band. The final score is the total points times the multiplier. Check sheets are required for logs with 200+ QSOs. Mail your log and summary sheet by 7 February to: "ARRL RTTY Roundup", 225 Main Street, Newington, CT, USA 06111. Alternatively, logs can be sent on DOS disk, or to the ARRL BBS (203-665-0090), or via Internet to contest@arrl.org.

### HA DX CW Contest

Jan 14/15, 2200 Saturday to 2200z Sunday

This popular contest takes place on the third full weekend of January each year. Categories are single operator single or multiband, multioperator single or multitransmitter, and SWL. Bands are 160-10 m. Exchange RST + serial number; HA/HG stations will add a 2 letter county code. Codes for each call area are (1) GV VA ZA, (2) KO VE, (3) SO TO BA, (4) FE, (5) BP, (6) NG HE, (7) PE SZ, (8) BN BE CS, (9) BO, (0) HA SA.

Score six points per HA/HG QSO, and three points for each non-HA QSO outside your own continent. Multipliers are the total HA counties worked per band. Final score equals total points x multiplier. Separate logs for each band are requested. Send logs with summary sheet and declaration within six weeks to "Hungarian Radioamateur Society, Box 86, Budapest H-1581, Hungary".

### CQ Worldwide 160 Metre DX Contest

CW: Jan 27-29, 2200z Friday to 1600z Sunday;

Phone: Feb 24-26, 2200z Friday to 1600z Sunday.

The CW and Phone sections of this contest are scheduled for the last full weekend of January and February each year. The object is to contact as many stations worldwide on 160 m as possible. VK to VK contacts are permitted for contest credit. Categories are single and multioperator. The use of packet, a spotting net, or logging assistant makes you multi-op. Suggested DX frequencies are 1830-1835; W/VEs will usually operate

outside this window. Look for Japan on 1907-1912.

Exchange RS(T) plus prefix or country abbreviation (W/VE will send RST plus state/province). Score two points for contacts with stations in own country, five points with stations in other countries in the same continent (continental boundary as for WAC), five points for contacts with MM stations, and ten points with stations in other WAC continents.

Multipliers are US states (max 48, KH6 & KL7 not included); Canadian provinces (max 13, as VO1 & VO2 are considered separately); and DXCC & WAE countries including KH6 and KL7. Maritime mobile stations no longer count as multipliers. The final score equals the total QSO points times total multiplier (US states + VE provinces + DX countries). Indicate CW or SSB on the envelope, and mail the log and paper summary sheet to: "CQ 160 Metre Contest, 76 North Broadway, Hicksville, NY 11801". Mailing deadlines are 28 Feb for CW, and 31 March for SSB.

### Canadian Provinces & Territories

Because so many American contests count Canadian provinces and territories as multipliers, I thought it would be helpful to list them for once and for all. So, for future reference, please note the following list:

Newfoundland (VO1, VO2); Prince Edward Island (VY2); Nova Scotia (VE1, CY9, CY0); New Brunswick (VE1); Quebec (VE2/VA2); Ontario (VE3/VA3); Manitoba (VE4); Saskatchewan (VE5); Alberta (VE6); British Columbia (VE7/VA7); North West Territories (VE8); Yukon (VY1).

### Results of 1993 SAC Contest

(Call/QSOs/points/mult/final score)

#### CW:

VK2APK*	178	280	58	16,240
VK6ZH	136	158	47	7,426
VK8AV	96	106	35	3,710
VK4XA	73	73	34	2,482
VK4TT	68	68	34	2,312

#### SSB:

VK2APK*	112	170	46	7,820
VK8AV	28	28	21	588

### Results of 1993 ARRL 10 m Contest

Call	Final score; QSOs; Mults; Hrs; Mode (A = mixed, B = phone, C = CW, D = multiop); Output Power (A = 5 W max, B = 150 W max, C = more than 150 W).			
VK2APK*	93,024	337	72	36 A B
VK8BE	1,976	35	19	36 A B
VK4NEF*	2,600	65	20	36 B A
VK2ARJ*	5,400	108	25	36 B B
VK2GAH	1,024	32	16	36 B B
VK4LW	1,760	80	11	36 B C

VK4XA*	93,600	390	60	21 C B
VK2VM	22,196	179	31	9 C B
VK4ICU	2,304	72	8	36 C B
VK3EFO	1,548	43	9	36 C B
VK2QF*	69,688	281	62	36 C C
VK4TT	54,180	301	45	36 C C
VK1DX*	114,800	646	82	36 D
(ops VK1s FF MOJ PJ, VK2s ILK IVK)				

### VHF — UHF FIELD DAY 1995

Presented by John VK3KWA

The annual VHF/UHF Field Day will be run on the weekend of 14/15 January 1995. The Ross Hull Contest will be in progress at this time and any contacts made for one can be counted for the other. Please remember that the Field Day exchange must include your Maidenhead locator, and that repeat contacts are allowed for the Field Day but not the Ross Hull Contest.

Several minor rule changes have been made in response to comments made by entrants last year. The timing of the Field Day has been changed to correspond as closely as possible to midday local time (within the constraints imposed by our annual mixture of standard and daylight savings times).

The flexible 24-hour period has been dropped because last year most stations packed up 24 hours after the start of the Field Day and there were few contacts to be had on the Sunday afternoon. The rules have also been changed to exclude 24-hour entrants from also submitting six-hour logs. There have also been minor changes to the general rules.

### Duration

VK6 only: 0400 UTC Saturday 14 January to 0400 UTC Sunday 15 January. All other call areas: 0100 UTC Saturday to 0100 UTC Sunday. In local time, the starting time is therefore 11 am in Queensland, 12 noon in other eastern states, 11.30 am in SA, and 12 noon in WA.

### Sections

A: Portable station, single operator, 24 hours.

B: Portable station, single operator, 6 hours.

C: Portable station, multiple operator, 24 hours.

D: Home station, 24 hours.

Entrants may submit logs for only one section. Six-hour operation must be for six consecutive hours, starting on the hour.

### General Rules

All modes and bands above 30MHz may be used. Contest exchanges should not be made on recognised DX calling

frequencies. Repeater, satellite and cross band contacts are not allowed.

Operation may be from any location. You may work stations within your own locator square. Each station may use only one callsign. A station is portable only if its equipment is portable.

### Contest Exchange

RS or RST reports, a three-digit serial number, and your Maidenhead locator. Serial numbers need not be consecutive.

### Repeat Contacts

Stations may be worked again on each band after three hours.

### Scoring

One point per contact. The band multipliers are:

6 m 2 m 70 cm 23 cm 13 cm Higher  
x1 x4 x7 x10 x13 x16

For each band, multiply the number of contacts by the number of locator squares worked on that band, then by the appropriate band multiplier. For example, on 2 metres, 20 contacts x 4 squares x 4 = 320 points. See the sample scoring table below.

### Logs

For each contact: UTC time, band, station worked, serial numbers and locator numbers exchanged, points claimed.

The front sheet should contain name, address and callsign, section entered, the period of operation to be scored (if entering the six hour section), and a scoring table.

The scoring table should be as follows:

Band	Contacts	Squares	Mult.	Total
6 m	xxxx	x	xxxx	x 1 = xxxx
2 m	xxxx	x	xxxx	x 4 = xxxx
70 cm	xxxx	x	xxxx	x 7 = xxxx
etc.				
Overall Total				xxxx

### Entries

Post logs to the Manager, VHF-UHF Field Day, PO Box 2175, Caulfield Junction VIC 3161. Logs must be received by Monday, 30 January 1995. Early logs would be appreciated.

### Awards

The overall winner will be the highest all-band scorer in Section A. Awards will also be made to the highest scorer on each band in Section A, and the highest scorers in Sections B, C and D.

'PO Box 2175, Caulfield Junction, VIC 3161

## Divisional Notes

### VK2 NOTES

Richard Murnane VK2SKY

The VK2 Notes return (again!), hopefully for good this time. In late September, Roger Harrison VK2ZRH resigned from the VK2 Council making a number of claims of illegal activities on the part of several Councillors. Council accepted his resignation, but rejected his stated reasons for doing so. Tony Liolio VK2ZL fills the vacant position left on Council, and Pixie Chapple is now Divisional Secretary; several other Council portfolios have been reallocated.

Things are at last getting back on an even keel. The broadcast team (most of whom had resigned over the last year) have now returned, and the Divisional President, Michael Corbin VK2PFQ, gives an address to the members each week. What he says might not always be what you'd like to hear, but it is what needs to be said.

The damage caused to the Dural facility when it was "closed down" in January is still being repaired, but most services have been restored.

The Divisional Voice Mailbox on 724-8793 seemed to fall into disuse shortly after the AGM. Hopefully, this service will soon carry the weekly news highlights from VK2WI once again.

Evidence is currently being prepared for an approach to the courts to allow the Division to hold fresh elections. Meanwhile, the interim Council is attempting to conduct the business of the Division with the help of an increasing number of volunteers. A handful of habitual malcontents on packet appear to have plenty of spare time on their hands; perhaps they'd care to do something positive for the Division?

### Spares Required for Dural

The Division is looking for type 807 valves for the AM broadcast transmitters at Dural. Our last request for 810's brought a good response — can we depend on you again? We're also looking to restore our broadcast service on 6 m SSB and we require a crystal locked transceiver for that band, with an output power of at least 10 watts. If you can provide the goods, please contact the Divisional Office.

### Message from the President

As this will be the last opportunity before Christmas, on behalf of myself and the "Council", I wish members, readers and their families a happy and Holy

Christmas, and everything you wish for yourselves in the New Year.

Michael Corbin VK2PFQ

### VK3 Notes

Barry Wilton VK3XV

### Christmas Holidays

The WIA Victoria office will close on 15 December 1994, and reopen on 7 February 1995. Membership applications received by post during this period will be processed.

### 80 Metre DX Window

A submission prepared by Peter VK3QI and David VK3EW has been tabled by WIA Victoria, and we are confident the SMA will soon grant an extension to the bandwidth of this important DX window.

### EMC and Amateur Operators

WIA Victoria has been closely monitoring the development of cable television and the proposed methods of distribution. The recently stated intention of Optus to distribute via fibre optics, line amplifiers and co-ax cable suspended overhead on poles currently used for electricity supply is of concern.

There could be potential for interference on amateur frequencies, and also for amateur operators to interfere with domestic television, if this method of distribution is utilised.

When the matter was raised with the SMA, a less than satisfactory response was received, and the SMA advised any problems encountered would be the responsibility of the telecommunications watch-dog, Austel.

WIA Victoria is dissatisfied with this response and intends to vigorously pursue this matter.

### Nominations for Council

Nominations for the 1994/95 Victorian Division Council close at noon on Friday, 13 January 1995. Nominations will only be accepted on forms available from the Secretary. Nomination forms must be obtained prior to close of business on Thursday, 15 December 1994. Nominations may be returned by ordinary mail to the office, and will be processed during the holiday period.

### Sunday Broadcast

During the year several members requested the broadcast be extended to the 20 m band to cater for mobile users

in interstate areas. Two surveys conducted produced very little in the way of support for the proposal.

Material for the broadcast continues to be in short supply and we are in need of a willing hand to produce scripts on a regular basis.

If there is not sufficient interest in the broadcast, and news gathering and production assistance is not forthcoming in the new year, Council will need to look to other options which include reducing the number of broadcasts put to air in any one month.

### Special Projects Funding

This initiative was very successful with financial assistance being provided for a number of projects which are now nearing completion. The majority of applications received for assistance involved extension to the packet network and linking of services.

We hope to be able to continue this assistance for projects of benefit to members in the new year, and submissions will be welcomed from other special interest groups.

Members will be advised both in Amateur Radio and on the Divisional broadcasts when requests should be made.

### The Council Extends Seasons Greetings to All Members.

### VK6 Notes

Peter Parker VK6BWI

At its Annual General Meeting on 5 October at Wireless Hill, the WA Amateur Digital Communications Association elected the following:

President	Phil VK6AD
Vice President	Ian VK6ZGA
Secretary	Rob VK6ABR
Technical Officer	Joe VK6ZTN
Broadcast Officer	Clem VK6CW
Auditor	Frank VK6JK
Committee	Rob VK6VP, Ray VK6RR, John VK6NT, Trish VK6QL.

Wireless Hill is an excellent VHF site, providing good coverage around the Perth Metropolitan area. The Association's PBBS is located here and has a user port on 144.725 MHz. RTTY users on 146.600 MHz can be linked through to the packet network by this system. The PBBS also transmits on 14.109 MHz to link us with the outside world. 147.575 MHz is used for forwarding between BBS systems.

It is understood that a digipeater at Cataby, between Perth and Geraldton, is proposed. To play your part in ensuring that this and other exciting projects come to fruition, you are welcome to attend the

Association's monthly meetings. They are on the first Wednesday of every month (except January) at the Wireless Hill Meeting Room, starting at 8 pm.

### Special Divisional Meeting Attracts Potential Amateurs

For many years, amateur radio study courses in Perth had been run through the TAFE system. These were dropped about two years ago. The Division has realised that, in this age of user pays and devolution, we must take our own initiatives to train and examine the amateurs of tomorrow. Accordingly, we held a special meeting on 3 October to ascertain interest for a proposed amateur radio course. Thanks to word-of-mouth and advertising in local newspapers, enough people attended to warrant a course being started. It will have begun by the time you read this, the first class being held on Tuesday, 8 November.

The class is being conducted every Tuesday night for approximately two hours over a twenty week period. It's being held in Bull Creek and the instructor is Allan Bell VK6SK. For further information on this and future courses, contact the WIA Divisional Education Coordinator, Rob VK6THB, on (09) 434 3283.

The VK6 Division wishes its members a safe and prosperous 1995.

### "QRM" — News from the Tasmanian Division

Robin L Harwood VK7RH

Sadly I have to report that two more VK7 hams have died recently. Rick Bray VK7ZZ passed away on 26 October after a long illness. He came from England and worked at the Australian Maritime College for nine years. He was active in several community groups, including the Northern Caverneering Group, and served as secretary of the Northern Branch of the WIA in the mid-eighties. He was also a driving force behind the AMC Amateur Radio Club. Rick checked in occasionally during the past year on the daily Tasmanian Sewing Circle Net on 3590 kHz.

Harry Bracken VK7BR was another amateur who was active in the North in the mid-sixties. He worked in the PMG's Department at various locations within the State.

As we come to the end of the calendar year, it seems to have become traditional for each Branch to wind up with either a BBQ or a Christmas Dinner. At deadline time only the Northern Branch has yet to finalise their plans, but these should be

announced on the weekly VK7NB broadcast on Wednesdays at 1930 hours locally on repeater 7000 and 3590 kHz.

The Southern Branch, also now known as VK7OTC, will be holding a Christmas BYO BBQ at the Domain Activity Centre on Sunday, 4 December from 11.00 am. The Northwestern Branch will be holding a Christmas Dinner at the Bass & Flinders Motel in Ulverstone on 13 December. This will be in lieu of the normal monthly meeting. For further details contact David Spicer VK7ZDJ.

The only scheduled monthly meeting will be the Southern Branch at the Domain Activity Centre on 7 December at 2000 hours. January is the quietest month with neither Northern nor Southern Branches meeting. However, the Divisional broadcast will be continuing throughout January although VK7NB will be in recess till the end of January.

In conclusion, may I, on behalf of the Tasmanian Division, extend Season's Greetings to all members of the Division and look forward to your active participation in 1995 which, coincidentally, is the Centenary of the Development of Wireless by Guglielmo Marconi.

ar

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# How's DX

Stephen Pall VK2PS\*

The other night I had a very bad dream. I woke up in a sweat. I dreamed that the US Treasury had decided to withdraw the \$US1.00 note from circulation. Can you imagine, if that ever became a reality, what would happen to the direct QSLing system? The well known "green stamp" no more! Disaster!

Not necessarily so. One opinion is that most of the award programs, which require a physical QSL card for proof of contact, will be forced to change their rules. Another opinion says that it will be not a problem, the bureau system will be used. At present most of the serious DXers do not use the bureau system because of its predictable weaknesses — slow, often very slow (one to three years, or more, turn around of cards); and the unpredictability, especially in the developing countries, of the existence or non-existence of QSL bureaus.

As a last resort, if there are no more green stamps, we will have to use IRCs, the International Reply Coupon system. This would seem to be the logical conclusion. There are some problems with IRCs also. Postal authorities in some countries, for example Germany, have a fixed monetary value placed on them. The German postal system values one IRC at DM 2.00 whilst the air-mail postage from Germany to a foreign country outside Europe, say Australia, is DM 3.00, so you need to send two IRCs to the German QSL Manager. Postal rates, the purchase price of IRCs, and the monetary foreign exchange system are interlinked. A year ago, and I am talking now about the Australian situation, one IRC cost a little over one Australian dollar (actually, \$A 1.35). If you bought some IRCs lately you found that you had to pay \$AUS2.00 for each of them. A hefty price increase and it was not publicised widely. On the other hand the purchase price of one IRC in Japan is 150 Yen which equates neatly with \$AUS 2.00.

What I am saying is this, and I am sticking my neck out for predicting the future, be prepared for a considerable increase in the near future of Australian Postal rates to foreign countries. Do not be misled by the multi-colour four page pamphlet released recently by Australia Post entitled "Five year price freeze". That refers only to domestic standard letter rate of 45c which will be frozen, at least until the beginning of 1997. The difference between 1997 and 1994, if my maths are correct, is only three years. Maybe

Australia Post uses a different mathematical system.

To make this polemic short my advice is to do all your direct QSLing now, before the end of the year, at a cheaper postal rate. Talking about the end of the year? Yes, the 12 months of 1994 are nearly over. I wish all my readers a joyous season, a healthy, prosperous and peaceful New Year, and good propagation on all bands.

## What is a DX Country?

With the present controversy surrounding the Pratas Island operation, the Scarborough Reef activity, the non-acceptance of the P5RS7 operation for DXCC credit, and the recent deliberations about the minimum size of a country, I feel it is time to summarise for readers the present rules of the DXCC regarding the definition of a "country".

When an area in question meets at least one of the following three points, it is eligible as a separate country listing for the DXCC countries list.

## Point 1 Government

Independent country or nation-state having sovereignty. Points to consider include: Body of society united together politically with definite territory, definite population, organised or controlled under one exclusive regime and engaging in foreign relations, has the capacity for international agreements, diplomatic relations, possible membership in United Nations, membership in the International Telecommunication Union, authorised user of ITU allocated callsign prefixes; issues currency, stamps, regulates foreign trade, etc.

## Point 2 Separation by Water

An island or a group of islands which is part of a DXCC country established by reason of Government, is considered as a separate DXCC country, if:

- The island, or the island group, are situated offshore, geographically separated by a minimum 225 miles of open water from a continent, or island or island group that makes up any part of the "parent" DXCC country; and
- A "second" island of the same DXCC country must have a separation by water of at least 500 miles from the first island and a separation of 225 miles from the "parent country".

## Point 3 Separation by Another DXCC Country

- Where a Point 1 DXCC country (government) composed of one or more continental land areas or of continental land areas and islands, is totally separated by an intervening DXCC country into two land areas which are at least 75 miles apart, two DXCC countries are created.
- Where a Point 1 DXCC country (Government) composed entirely of islands is totally separated by an intervening DXCC country into two areas, then two DXCC countries result. No minimal distances required by separation.

## Point 4 Ineligible Areas

- Any area which is unclaimed or not owned by any recognised government.
- Any demilitarised zone, neutral zone, buffer zone.
- The following do not count as a separate DXCC country from the host country: embassies, consulates, extra-territorial legal entities of any nature including, but not limited to, monuments, offices of the United Nations Agencies or related organisations, other intergovernmental organisations or diplomatic Missions.

Of course, the above is a précis of the rules and regulations of the DXCC award. If you want the total information about the Award, send \$US2.00 for a handsome 30 page booklet entitled "The ARRL DXCC Countries List" containing an application form for the award to: The ARRL, 225 Main St, Newington, CT 06111 USA. Your booklet will arrive by sea-mail.

## Bhutan AS

It was late in October on a Thursday night at a Japanese restaurant in Sydney's Crow's Nest area. A small group of amateurs raised their glasses to the expected success of an upcoming possible DXpedition to Bhutan. Jim VK9NS was full of enthusiasm. Atsu VK2BEX, a well known DXpeditioner in his own right, and myself, not yet a DXpeditioner but a recorder of this column, were the listeners.

Jim recalled the many years of negotiations and preparations prior to his first visit to that country, between 21 March and 11 April 1990, when he made approximately 15,000 QSOs. Jim went back to Bhutan a year later with Kirsti VK9NL. He hoped to operate again but did not succeed in obtaining permission to operate. However, he has maintained close contact with the Bhutanese officials since 1991. Finally there was some result. In October 1994 he was invited to Bhutan by the Bhutanese Ministry of

Communication for a visit in connection with the Amateur Radio Service. Jim passed through Sydney on his way to the Kingdom of Bhutan on 27 October. He intended to stay in Bhutan, and possibly also in Bangladesh, until the end of November. An old friend and DXer, Kan JA1BK, will accompany him on his Bhutan adventure.

For those who are not familiar with the geography of Bhutan here are a few basic facts about the country. It is situated in the south eastern part of Asia, immediately south of the Himalayas. China, India and Nepal are the neighbouring countries. It is a small mountainous country of about 47,000 square km in area with a population of approximately 1.5 million. The capital of the country is Thimpu with about 12,000 residents. The Kingdom of Bhutan has been governed by a dynasty of hereditary kings since 1907.

Bhutan was more or less a closed country and has opened up to outside western influence only since World War II. Road improvements have opened up many parts of the country and airlinks have been established with neighbouring countries. Despite modernisation the Bhutanese try to retain their unique religious and cultural heritage. The future of amateur radio lies entirely with the Bhutanese. Pradhan A51PN was the last Bhutanese who operated amateur radio from that country in the early 1980s. Jim's visits in 1990 and 1991, and his present visit, hopefully will assist in establishing the amateur radio service for the Bhutanese and for the rest of the amateur radio fraternity.

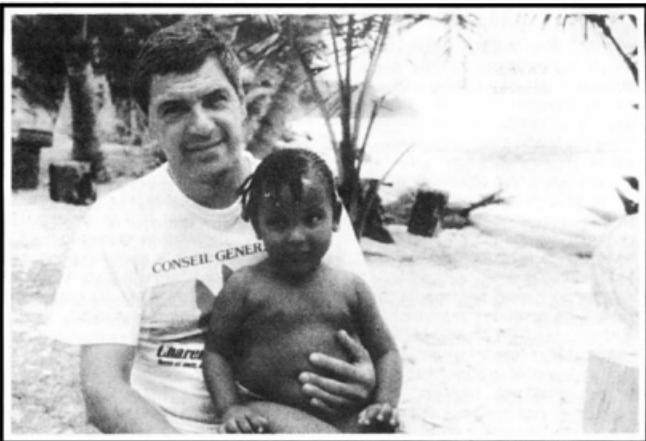
## Decision of the DXCC Awards Committee

The DXAC, the DX Advisory Committee, made some recommendations as reported in a press-release on 24 August (See November *Amateur Radio*) about the minimum size for a new DXCC country.

The DXCC Awards Committee has voted five to two against the DXAC's recommendation as per a news release issued on 6 October. Those voting against shared the feeling that a minimum size rule was not needed.

Awards committee chairman, Chuck Hutchinson K8CH, advised the result with DXAC chairman, Bob Beatty W4VQ, immediately after the vote. Standard operating procedure for the committee allows the DXAC to resubmit a recommendation (with or without changes) on appeal, and Chairman Beatty has announced his intention to do that. Individuals may send comments to ARRL HQ. Comments addressed to the DXAC will be read by members of both committees.

DXAC Chairman Beatty has declared



**Jean Michel TR8JH, Gabon, with a child from the local village.**

a moratorium on new DXCC country petitions that may be affected by a minimum size rule. This moratorium will continue until such time as the deliberation on this issue is complete.

## Future DX Activity

- Dave A22MN is very active on all bands. He will stay there until March 1995. QSL via WA8JOC.
- HS0/DL2VK is Reiner who is active from the Northeast of Thailand — Nakhon Phanom — for 6 months starting 10 October. He prefers CW but works also in SSB and digital modes.
- There is a rumour, originating from Germany, that a group of ZLs intend to activate the Balleny Island group (Antarctica) from Sabrina Island in December 1994. Sabrina Island is located on the West side of the island group. On the island there are the ruins of a polar station built in 1948 but abandoned some years later.
- FR5HG/E is active on Europa Island, length of stay not known. Europa is a small rocky and sandy island located at 22° 20' S and 40° 21' E off Madagascar.
- Walt G4NYY, Tim G4VXE, and Dave WG3I will be active from Nassau, New Providence island from 10 to 18 December on 160 to 10 m, including the WARC Bands. Operation will be mainly in CW. Callsigns will be C6A/home call. QSL via home call.
- TJ1JR is active. Randy is a missionary who arrived in Cameroon with his family in July and will be there for the next four years. QSL via N7VEW.
- VK0IX will be active from Casey base, Antarctica. QSL via VK5PO.
- HH1D and HH1T are Darlene KC8CTC and her husband Tim KB8CTD. They are missionaries in the mountain area of Haiti. QSL via NE8Z.
- Jeff VP9NC is active mostly on CW. QSL to WB2YQH.
- Peter XT2BW has returned to Burkina Faso and expects to be active until the end of 1994. QSL to WB2YQH.
- There was some news back in June 1994 that Joe DF1AL was planning a DXpedition to Congo, TN, from 27 February to 6 April 1995. No further news has come to hand since.
- A92FV is on the bands. His length of stay is unknown. The operator is GO0AB and he is active on the CW bands.
- The following Canadian special prefixes may be used to commemorate the International Year of the Family from 29 October to 29 December: VB, VG, X09, X00, XN9, XNO.
- Joe FK8GY will be active from Lifou Island in the Loyalty Group (OC-33), between 10 and 12 January 1995 on 20, 40 and 80 metres. Those who work him will receive a Diploma from the REF, the French national amateur body. QSL to Box 7219 Noumea, New Calendonia.

## Interesting QSOs and QSL Information

E = East Coast W = West Coast M = the rest of Australia.

- VR2KF — Kazu — 14226 — SSB — 1200 — Oct (E). QSL to Kazu, GPO Box 4724, Hong Kong.
- 9Y4NG — Arnold — 14225 — SSB — 1303 — Sep (E). QSL to A Griffith, 646

Ocean Ave, Gulf View, Laromain, Trinidad.

- 5T5JC — Eric — 7083 — SSB — 0654 — Sept (E). QSL to F6FNU, Antoine Baldeck, BP 14, F-91291, Arpajon Cedex, France.
- HC5EA — Edgar — 14191 — SSB — 0506 — Oct (E). QSL to The Manager, PO Box 14, Cuenca, Ecuador.
- HS0/DL2VK — Reiner — 14020 — CW — 1121 — Oct (W). QSL to DL2VK, Reiner Eischens, Dieder Str, 95, D-65549, Limburg, Germany.
- YN5JAR — Jose — 7083 — SSB — 0642 — Oct (E). QSL to Jose Antonio Roman Matus, PO Box 122, Jinotepe, Nicaragua.
- 8J1RL — Masa — 14018 — CW — 0953 — Sep (W). QSL to Japanese QSL Bureau.
- 9J2GO — George — 14164 — SSB — 0527 — Sep (W). QSL to George, 56 Datura Ave, Luanshya, Zambia, Africa.
- VU2LX — Laxman — 14015 — CW — 0218 — Sep (W). QSL to K Lakshmannan, 30/3 Nanjappa Rd, Shanthi Nagar, Bangalore, 560027, India.
- 4L4TL — Tom — 14190 — SSB — 0537 — Oct (E). QSL to TA7KA, Mr Omar, PO Box 71, TR-61000, Trabzon, Turkey.
- JW8GV — Ala — 7084 — SSB — 1108 — Oct (E). QSL to The Manager, PO Box 27, Longyearbyen, N-9170 Norway.
- 9V1XQ — Mike — 7083 — SSB — 1001 — Oct (E). QSL to G4PKP, John Jones, 24 Matthew St, Liverpool, Merseyside, England, L2 6RE.
- Those who are operating in the 75 m "DX window" must have heard a very strong RTTY signal on 3796.5 kHz, causing severe QRM. This signal appeared intermittently early in October. According to the FCC the signal is coming from the Caribbean, probably from Haiti, and it could be of US military origin.
- 9N1SC was the call of a Mount Everest DXpedition activated by G4SSC.
- The QSL address of FG5BG is Georges Santalikian, 44 Rue Amedee Fengerol Brest, F-97130, Capesterre, Guadeloupe, FWI France
- Is this a trend for the future of amateur radio? The IOTA Committee of the RSGB and Yaesu UK Ltd announced that they have entered into a sponsorship agreement by which Yaesu becomes the principal sponsor of the RSGB IOTA Program. The agreement is a worldwide agreement and runs for three years from 1 October 1994.
- Did you know this? The DXCC Award came into being as a result of an article in October 1935 "QST" entitled "How to count countries worked; a new DX scoring system" by Clinton B De Soto W1CBD. He described the first country criteria as "The basic rule is simple and direct; each discrete geographical or political entity is considered to be a country."
- Art NN7A sent me a note about his proposed activity in Victoria, South Australia and Northern Territory during the month of November. Unfortunately, his letter arrived after the deadline for the November issue of Amateur Radio. Art operated as VK3FBM and his wife Dede as VK3JKQ from various places including Phillip Island (OC-136) and Kangaroo Island (OC-139). Please QSL direct to Art Phillips, PO Box 201, Flagstaff, AZ 86002 USA or via the W7 QSL Bureau.
- ZL6DJ was a special event station celebrating the Diamond Jubilee of the NZART.
- If you worked 3D2BE, QSL to HB9KAS.
- A contact with ED5DX can be confirmed via EA5BYP.
- TI2JJP was active from Cocos Island (Pacific Ocean) from 20 to 29 October as TI9JJP.
- Kan JA1BK is returning the donations that were made for the P5RS7 DXpedition, which was not accepted for DXCC credit.
- Did you know that before you are allowed to operate on SSB as a resident of Bermuda (VP9), you must first have 500 CW contacts?
- VK9RNI is a new 6 metre beacon being installed on Norfolk Island.
- If you come across a ZL1BAI callsign, he is none other than Jim VK9NS.
- The correct QSL manager for the contest station HG73DX is HA1TKA. This includes past, present and future activity. Direct or via the Bureau.

### QSLs Received

H44MS (3W DL2GAC) — YJ0AVH (2M VK4CCR) — TK5BF (2W op) — HP8ADU (5W op) — F5NBX (2W op) — S59AA (2M op) — V44KAI (3M op) — YS1DRF (6W 2PD) — C41A (5W 9A2AJ) — VP2EJ (4W N6ZJM).

### Thank You

Many thanks to those who have contributed to this column, but especially to VK1IFF, VK2KCP, VK2KFU, VK4AAR, VK6DX and VK9NS. Special thanks also to the following sources of information, ORZ DX, The DX Bulletin, DX News Sheet, The W6GO/K6HHD QSL Managers List, INDEXA.

\*PO Box 93, Dural, NSW 2158

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Jim TU4EI, Ivory Coast, with pet spider monkey "Bobo".

# FTAC Notes

John Martin VK3KWA, Chairman, Federal Technical Advisory Committee\*.

## 2.4 GHz Band Plan

This further revised plan takes into account all comments received on the earlier drafts, and it is proposed to present it to the WIA Federal Council for formal adoption early next year. The plan allows both terrestrial and satellite operation with a single transverter crystal. Other main features include two wideband channels, each 18 MHz wide, for FM ATV, and separate FM simplex segments for voice and data.

A fully detailed copy of this plan has been circulated to all states and copies are also available on request via the WIA Federal Office.

### 2400-2403 SATELLITES

2403-2406 NARROW BAND MODES (Note 1)

2406-2424 WIDEBAND MODES (Note 2)

2424-2425 NARROW BAND MODES (Note 3)

2425-2426 FM SIMPLEX (VOICE)

2426-2428 FM SIMPLEX (DATA)

2428-2430 FM DUPLEX (Note 4)

2430-2448 WIDEBAND MODES (Note 2)

2448-2450 FM DUPLEX (Note 4)

### Notes

1. The 2403-2404 MHz segment subdivided as per existing plan for 2304 MHz, ie DX calling frequency 2403.1 MHz. Inband linear translators possible using 2404/2424 MHz, and crossband on 2405 MHz.
2. FM ATV frequencies 2415 +/- 9 MHz and 2439 +/- 9 MHz. Recommended primary channel for FM ATV: 2430-2448 MHz. The 2406-2424 MHz channel to be available until/unless required by future satellites.
3. Reserved for possible use for Region III NB and linear translators.
4. These segments intended primarily for links but could also be used for experimental repeaters.

## 1.2 GHz Band Plan

The new plan for this band is still under discussion but a decision will be needed soon. A number of comments have been received from repeater groups, ATV groups and others, and there is general agreement on changing over to the international standard 20 MHz repeater split after the remaining 1275 MHz radars close down.

There were some objections to the band plan proposal circulated in July, especially over the bandwidth and placement of the ATV channel, and the need for a wideband data segment. A further revised proposal is shown below

which I believe overcomes the problems in the earlier plan.

The main changes are an 18 MHz wide ATV channel at 1274-1292 MHz, and new FM simplex segments for voice at 1294 MHz and data at 1297 MHz. A fully detailed copy of this plan can be obtained on request via the WIA federal office.

This proposal has already been circulated to all WIA Divisions, and comments would be appreciated as soon as possible. I am hopeful that agreement can be reached in time for the plan to be finalised and approved at the same time as the 13 cm plan early next year.

1240-1270 No change from current band plan

1270-1272 NARROW BAND MODES (Note 1)

1272-1273 LINKS

1273-1274 REPEATER OUTPUTS

1274-1292 ATV CHANNEL 2 (Note 2)

1274-1281 AM ATV

1283 +/- 9 MHz FM ATV

1285-1292 AM ATV

1292-1293 LINKS

1293-1294 REPEATER INPUTS

1294-1295 FM SIMPLEX (VOICE) (Note 3)

1295-1297 NARROW BAND MODES (Note 1)

1297-1300 FM SIMPLEX (DATA) (Note 4)

### Notes

1. These segments subdivided as per existing plan for 1296 MHz.
2. Recommended use for simplex or repeater outputs.
3. Channel spacing 25 kHz, calling frequency 1294.5 MHz.
4. Intended primarily for high speed data with 100 kHz channel spacing. Further details to be discussed with packet radio groups.

## Packet Radio Band Plan Proposal

The South Australian Division has proposed an increase in the number of packet radio channels on both 2 metres and 70 cm, and the allocation of several 70 cm repeater pairs for use by regenerative repeaters. This proposal has been circulated to all Divisions together with an alternative proposal from FTAC. Full details of all of these proposals will be published next month.

## National Foxhunting Channels

It has been suggested that there is a need for national foxhunting channels on VHF bands. I do not have much information on foxhunt activity, except that the mode used is usually FM and that different states use different frequencies. A national foxhunting frequency would simplify matters for national competitions and reduce the possibility of QRM. For that reason it would be a good idea to pick channels in the less used parts of each band.

I would appreciate any comments and suggestions on this. To start the ball rolling, I would suggest the following channels: 53300, 145300, 433850.

On 23 cm, the frequency depends on proposed changes to the band plan. If the new 23 cm band plan shown above is adopted, I would suggest 1294.850 MHz for the foxhunting channel.

## 80 m DX Window

Mr Peter Allen, Acting Manager, Technical Services Team of the SMA has written confirming that the Regulations relating to the 80 m DX window are as described in last month's notes.

He stated that the carrier frequency for LSB stations in this window should be limited to 3.798 to 3.800 kHz.

He also stated it is most important that services operating immediately below the 80 m DX window do not receive interference from out-of-band amateur transmissions.

\*PO Box 2175, Caulfield Junction, VIC 3161

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## WIA News

### New Federal Secretary

Mr Lewis Badge has been appointed the new WIA Federal Secretary. His appointment was made by the WIA Federal Executive at the quarterly extraordinary convention over the weekend of 29-30th October. He took up his appointment in early November. Mr Badge is an accountant by profession and has a commercial background as a company secretary.

Donna Reilly, who served as Federal Secretary following Bruce Thorne's resignation in August, has returned to her previous role as Office Manager.

# International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch

Gordon Loveday VK4KAL\*

## Live Intruder Watching Nets

This material was taken "off air" by VK4BRG and passed to VK4KAL.

Are you concerned about the future of our exclusive frequencies, their orderly use by amateurs and the growing number of pirates, intruders and QRM on our bands? If so, please read on. I make the following suggestions:-

1. Only we ourselves will take full care of our hobby. We must speak for ourselves and protect our own interests.
2. The Intruder Watch organisations and monitoring system are doing just that, but do not receive enough support. If all of us just devoted a few hours operating time, even once a month, to logging intruders and reporting them to the co-ordinators, it could make a really big difference.
3. About 75% of the reports received by the intruder watch services appear to lack the vitally needed information necessary to "busting an intruder", eg QTH(country), or identity of the intruder. This information is usually missing for the following reasons:-

(a) Intruders do not usually give this information in their transmissions;  
(b) Reports by only one or two amateurs are usually of short duration, thus insufficient information could be gathered, except time, date, frequency; and  
(c) The intruders do not always follow regular schedules and may re-appear on other frequencies in our bands on other days.

I think this situation can be radically improved with live on-air reporting through a Worldwide Intruder Watch Network, which would operate by collecting on air reports (often live) and pooling the resources of radio amateurs checking into the network, eg by rotating beams from different countries, a good idea of the approximate location of an intruder can be determined and, with co-operation of net amateurs in the country concerned, the location narrowed down even further. A report then can contain the vital information leading to effective results — intruders generally do not like to be famous!

These efforts need co-ordinating in an efficient and organised manner, with net frequencies, co-ordinators, net control stations and region networks. Such a

network can assist all intruder watch monitoring systems in a more effective way than relying on the slow process of the postal system and the few dedicated amateurs sending in regular reports by mail. It is also much more fun to have a live net where fellow "intruder busters" can meet and share information and expertise, using RDF techniques, language skills and knowledge of propagation, unusual modes, as well as taking advantage of our wide geographical dispersal. A monthly bulletin could still be compiled and sent to subscribers listing monitored intruders.

If you are interested in joining this effort, either as a casual reporter, checking into the net, as a control station, or co-ordinator, or regular monitor, please contact ST2AA @ I5FLN.ITA.EU or call ST2AA on 14.068, giving: Call and Name; rigs/antennas; modes used; ways in which you can help; postal address; and/or BBS.

73 de Lou ST2AA.

It would seem that we in VK have a very good general set up, but these notes should be read with the desire to increase our number of observers in ALL STATES. The coming months are going to allow a greater number of intrusions to be heard. DON'T COMPLAIN to your pal overseas, SEND me your complaint, Freepost

Number 4, and get him/her to lodge a similar complaint in their country. It is your fault if you DO NOT ACT, NOW.

## Some Notes on Intrusions from Indonesia

From IARUMS notes of September 1994, an Indonesian broadcast station comes on air on 7.098.7 MHz before 1000 UTC, no set time, often 0945 UTC at S 4 (on scale of 1 — 5). Some distortion, program is speech and "hit parade". Bearing from Brisbane of 305 to 310 degrees, ID as Island of Java.

Note that in 1988/89, 7.098 MHz was assigned to Yogyakarta, Indonesia with low power of 10 kW; logs of those years gave reports of S3. The listing was 7.098 variable by 0.5 kHz. No ITU listing above this in 1994.

Most interference seems to be in the lower frequency bands at present.

PA7 is a 21 MHz intruder. Tfc is "Ministry of Foreign Affairs". The frequencies are 21.110, 21.114 or 21.220 MHz. Also to be found on this latter frequency is BR6, active with Tfc often at 0400 and 0600, but has moved frequency to either 21.114 or 21.110. I suspect this was due to amateur pressure. More amateurs should pile up on this frequency and squeeze BR6 off the air.

Moscow Naval Radio has claimed

&lt;/div

## Education Notes

Brenda M Edmonds VK3KT\* Federal Education Coordinator

In September I had the pleasure of attending the IARU Region 3 Conference in Singapore. I had not thought of attending until it was pointed out that there were a number of items on the agenda in which I would be very interested or to which I could contribute. A full report from Kevin Olds, the WIA delegate, has already been published, but I would like to elaborate on some of my special interests.

A major item was the proposal for international recognition of amateur licences to reduce the formalities required when amateurs wish to visit another country, or to change address permanently.

In Region 1 this is being done by way of the CEPT licence agreement. Countries which are signatories to this agreement accept the licences of all other such countries, so that reciprocal licences are not needed for visits. In addition, the European countries are investigating the possibilities of a "Harmonised" licence,

i.e. a licence syllabus which is mutually agreed so that licences issued by all countries are of equal standard.

In Region 2 the same result is achieved by an International Permit, similar to an international driving licence, which is accepted by all the countries which have joined the scheme.

The Conference agreed that Region 3 countries should seek international recognition for their licences, but gave no directions for further action. In Australia, the SMA is presently working towards the acceptance of our licences for CEPT accreditation. New Zealand has already been accepted into the scheme. It seems to me that there is room for both approaches, i.e. the agreement with the European countries and the development of the "harmonised licence" in the Pacific area. From what I have seen, the examination syllabuses in some neighbouring countries are very similar to ours although, of course, the depth may vary and I have not seen many overseas examination papers.

A lot of Conference time was spent discussing ways in which amateur radio could be encouraged in countries where amateurs are not presently active. In some there is actual prohibition of such activities, but in others there are perhaps a couple of amateurs who need help to gain recognition from their governments and to enable training and encouragement of new recruits. I will discuss some of the suggested strategies in a later column.

In addition, of course, the interchange and discussions which took place outside the Conference sessions were of great value. I found it very rewarding to meet with representatives of the RSGB and other societies and to hear how their examinations are structured, or the problems which beset them. Some problems seem to be common to many societies. We are very lucky in the good relationship which exists between the WIA and the SMA.

My main regret from the trip was that there was not enough time to talk to more of the delegates and observers. There was obviously a lot of information available which I could not collect in the time.

\*PO Box 445, Blackburn VIC 3130  
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## An Old Timer Reflects....

Des Greenham VK3CO (SK) continues to look back over 50 years of amateur radio operation.

Is HF radio communication irrelevant today?

I wonder, after a recent experience. Our Rotary club was hosting a group from Brazil and one night one of the team asked me if I could take her to a "card" phone. I took her to the phone and I sat in the car waiting. She returned to the car in about seven minutes and told me she had called Brazil and ascertained a phone number in Japan, then called Japan and arranged her plans for a visit. All this in seven minutes and at a moderate cost!

This demonstrates modern technology and, in comparison to a Ham station calling CQ, makes us look quite primitive. This episode caused me to recall an experience in 1950 when communication overseas by phone was very limited and not readily available to the public. One day, on 15 metres, I heard a station in Hawaii calling "CQ Melbourne". As I was living in Melbourne at that time I answered the call. I was asked if I knew a place called "Springvale" and answered in the affirmative. He told me the story.

His commanding officer at the US Navy base on Oahu Island had arranged for his Australian wife and daughter to visit her parents who lived in Springvale. It was thought she had arrived but no message had been received from her and he was concerned for their safety. After receiving the address, my wife and I set off late at night to find the missing lady. We finally found the house in a remote part of Springvale and I will never forget the surprise on the lady's face when I announced that I had been speaking to her husband in Hawaii!

We arranged for Joan and her daughter to visit our home and speak with her husband. This went well and we had a regular "sked" each Sunday afternoon for the entire time of her visit here. This was 40 years ago and we kept in touch for many years until Joan's unfortunate death some 2 years ago.

This was amateur radio in those days, and is only one of numerous stories where amateur radio provided a special service for people.

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# Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

## JOTA Went Well

Well, JOTA is over for another year. I would like to thank various people in this year's event, where I assisted. I am a recent amateur of only 12 months, and it was my first go at JOTA. The first time for everything is always different from what one expects.

Contrary to what I had heard about the organisation between the Scouts/Guides and amateur radio operators, I compliment the Tea Tree Gully Baden Powell Scout Group for the orderly conduct of the various groups of Scouts and Guides that were present over this JOTA weekend. Not only this but for the help given to me during the times I was "in the chair". My thanks go to Diane, Ivan (Skip), Bob, and to those behind the scenes. Special thanks to Trevor VK5ATQ for supplying, and allowing me to operate, his equipment. It's a pity not more amateurs assist in this event.

Hopefully I will be back next year with a full callsign and will try a little harder to bring in those elusive DX stations to JOTA.

John P Malusa VK5ZJP  
7 Pope Crescent  
Hope Valley SA 5090

## Wrong "Facts"

I refer to Amateur Radio, September 1994 and the letter sent in by Jack van Schaik VK3AAC. Regarding this letter, my thoughts are these:- Don't be sarcastic unless you know all your facts are correct.

VK3AAC should have known that in 1957 VK2ZAB could not have gained access to any HF band by passing CW at 5 wpm as no such exam existed then. Furthermore, VK2ZAB would not have had any further luck by passing a 10 wpm exam as the required CW speed at that time was 14 wpm. Not only this, but after three months from sitting the theory exam the entire test theory and CW may have had to be taken. This latter point could be open to doubt but the first two points have been documented.

Victor Barker VK2BTV  
41 Skyline Street  
Gorokan NSW 2263

## High School Help

Richard Jenkins VK1RJ, in the Federal QSP in the August issue of Amateur Radio, emphasised the need to help schools develop radio interests. Jim Beattie VK4WJB followed this up in Over to You in the October issue.

Since retiring to Leeton, NSW nearly three years ago, I have been endeavouring to assist with the formation of an Electronics Section in the Leeton High School. The young people there have responded in a very positive manner and several have expressed an interest in amateur radio.

With a vision of perhaps forming a Leeton Amateur Radio Group I have tried to encourage these young people but with a degree of difficulty in expanding that interest. Any ideas both practical and theoretical, or offers to sell material suitable to encourage further developments, would be highly appreciated.

## Packet World

Grant Willis VK5ZWI\*

### Setting TNC Audio Levels

Your packet station will work most efficiently if your audio transmit and receive levels are set correctly. The best performance is found with an audio deviation of your FM signal of around 3 kHz. It is unfortunate that a large proportion of packet stations run well in excess of this figure! In the case of packet, LOUDER IS NOT ALWAYS BETTER. A similar case also occurs with the receive audio from your radio speaker output to your TNC. Many people either set their receive audio level too low or too high. If it is too low, you will miss packets because the modem could not resolve them properly, and if it is too high you will miss packets due to the audio distorting in the modem.

In setting both transmit and receive audio levels in the absence of any test equipment, always set both controls to a minimum and then increase your receive level until you are copying packets on an active channel and then, while trying to connect, slowly increase your transmit audio level. Once you have connected, stop adjusting your levels as you are now in the ballpark.

Another problem with packet tones that you transmit and receive may be that the relative levels between the 1200 Hz and 2200 Hz tones are not the same. (You will only notice this on a CRO, although it can have a marked effect on your receive error

I am not a teacher, being there only to assist, and depend on the good will of the staff. My own personal equipment was unfortunately relinquished when leaving New Zealand for Leeton.

Patrick H Adams VK2GRQ  
(formerly ZL3AAR)  
1/37 Palm Avenue Leeton NSW 2705

## Northcote High School Re-unions

I would be pleased to hear from any VK members who were students at Northcote and District High School, Melbourne, between 1940 and 1950.

Northcote High Ex-Students Association have been actively engaged in class reunions and information is required for our newsletters, etc.

Max Morris VK3GMM  
PO Box 222  
Rye VIC 3941  
ar

rate). This difference can be caused by the pre-emphasis and de-emphasis in your FM transmitter/receiver not being correct. Some experimentation with audio filters between the TNC and the radio can improve the situation.

### Choosing RF Power Output Level and Antennas

One of the primary causes of performance degradation on any packet channel is HIDDEN TRANSMITTERS. If your station can't be heard by most, if not all, of the other packet stations on a channel, then you are going to suffer collisions. You should, where possible, use antennas and RF power that enable you to hear as many stations on the channel as possible, NOT JUST THE LOCAL BBS OR REPEATER. A good starting power is probably 10 to 25 watts, with a reasonable omnidirectional antenna that is clear of any local obstructions.

Country stations may have difficulty hearing many stations (in many cases it will be impossible) due to terrain or distance but, in the cities, you should be able to come close. To assist in hearing other stations, your choice of operating frequency should be made carefully. Operating frequency should be based on the channel with the closest BBS or Packet repeater. If everyone else in an area did the same then the distances between all operators on a channel is

likely to be reduced and hence the probability of everyone hearing everyone else is increased.

### Setting Basic TNC Parameters

I will look at the various TNC parameters over coming issues. This issue I will start with the TXDELAY parameter.

**TXDELAY** — Transmitter Keyup Delay. This parameter tells your TNC how long it has to key up your transmitter before sending any data on the channel. The TXDELAY parameter needs to be set to a value longer than the time it takes your transmitter to turn on and start sending its RF. This time period can be governed by the lockup time of the radio's synthesiser, or the pull in time of a relay. It should also be as long as the slowest squelch on the channel (although most squelches appear to operate faster than most transmitters).

A good starting point is to set this to 250 milliseconds (check your TNC or modem software manual for any multiples used in the actual command — many TNCs will use a parameter of 25 to represent 250 ms). You should either increase or decrease this parameter as required. If you are having problems connecting (and you have already set your audio levels) you could try making this parameter fairly long (say 500 ms). Make sure you can connect to someone and then slowly reduce this in increments of 50 ms until you can no longer connect. Then increase it by 50 ms and leave this set. Be aware that the TNC's default value may not always be correct for your particular station.

That's an introduction on how to connect a packet station together. There are lots of tricks and tips that can be employed.

If you are having problems getting started you should try contacting your local radio club where you are likely to find other packet operators who can help you.

### Software Available

There is a large variety of packet software available for the PC. If you are using a TNC then a good basic starters' program is "YAPP" written by WA7MBL. This offers basic terminal support as well as the ability to send and receive binary files using the YAPP protocol supported by most BBS stations.

Some other packages available, as either freeware or shareware, include PaKet6, LanLink, TPK, Graphic Packet, Super Packet, PTM and many others. Your final choice of software depends on the features you want. Even most telephone modem terminal programs can be used with packet TNCs. If you are looking for a good packet program (and more importantly help in configuring it) then contact your local radio club or a local packet operator in your area. They should be able to help you get started.

### Conclusion

Next month I will look a little more at TNC parameters. I will also take a look at how a packet BBS station can be put together and, in particular, give an insight into the VK5TTY remote packet BBS in Adelaide.

If you have a question you think would be of interest to other packet operators as well, then why not send it in to the *Packet Doctor*, C/o WIA SA Div, GPO Box 1234 Adelaide SA 5001. Your answer might appear in future editions of "Amateur Packet World".

\*C/o GPO Box 1234, Adelaide SA 5001  
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## WIA News

### WIA Federal Budget

The October quarterly convention of the WIA Federal Council, held in Melbourne over 29-30th of the month, considered the 1995 budget in some depth.

Forecasting a further small decline in income from membership subscriptions, together with a fall in costs in some areas, the Council looked at the Federal Office operations and decided on a conservative approach, budgeting for economies in several critical areas. Overall expenditure was set at a level below the past years' figures.

However, an increase in SMA Liaison costs was budgeted to cover travel expenses expected following a separate Council decision to boost representation over the coming year. Costs for production of *Amateur Radio* magazine were maintained at forecast levels.

In an effort to economise on Federal Office computer system costs and to further streamline office operations, the computer system software and hardware is to be upgraded, commencing in January. Bill Wardrop VK5AWM, VK5 Federal Councillor, volunteered his services to assist in this process and is to spend some time in the Federal Office during January.

# \*\*\* Ham Log: New Version 3.1 Release!!! \*\*\*

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# Pounding Brass

Stephen P Smith VK2SPS\*

Integrated circuit technology has always fascinated me, especially the family range of IC chips the 8043, 8044, M, B, and ABM versions.

At one time or another in your amateur career you would have come across one of the abovementioned chips, and have probably replaced an older version 8043 with the newer 8044. I recently did this in my Yaesu 901DM transceiver. Or are you into home brewing an electronic keyer for personal use? These chips are symbolic to electronic Morse code reproduction where simplicity and speed are the major concerns to the operator.

Before we look at the family of IC chips, a little background history on the founder is called for. John G Curtis, founder of Curtis Electro Devices Inc was born in Bradford, Pennsylvania in 1930 and obtained his amateur call W3NSJ at the age of 17. John Curtis graduated from the Pennsylvania State University in 1952, obtaining a BS in Electrical Engineering. He joined and served with the US Navy from 1954 to 1959, during which time he was stationed in Yokosuka, Japan.

After his discharge from the navy as a Lieutenant he was employed by the Signetics Corporation, an integrated circuit manufacturer. In 1968 John founded Curtis Electro Devices, specialising in electronic keyers and Morse keyboards. His first electronic keyer was the EK-38. Sometime later the 8043 IC chip was introduced to the American market. This chip underwent a number of design changes over the years and at present we have the 8044ABM.

Currently the company manufactures test equipment along with the ABM IC chip for the commercial market. Mr Curtis also holds the extra class call sign of K6KU.

Let us now focus our attention on the family range of integrated circuits. Starting with the 8043 and working our way through to the 8044 ABM. Chips covered will include M, B and ABM versions of the 8044 IC chip.

## 8043 Version

The 8043 was first introduced in 1973 and was the first integrated circuit designed specifically to perform the electronic Morse keyer function. Utilising CMOS metal Gate technology using FET switching for noise immunity and low power consumption, it was then "state of the art" electronics.

The IC included a clock oscillator, debouncing circuitry for the key paddles,

logic to produce dashes and iambic mode (alternating dots and dashes when both paddles are held together), sidetone oscillator, weighting circuitry (to lengthen dots or dashes) and, finally, an output stage capable of driving the NPN Keying Transistor. Under operating conditions, 90% of the power consumed is used for driving the sidetone and output transistor.

## 8044 Version

Around 1975 an improved version of the 8043 was introduced to the market and its designation was changed to 8044. It included two major improvements. Firstly, it did not require a symmetry adjustment to equalise the length of dots and spaces, and it added dash memory for the true iambic operation (dashes could now be inserted reliably). Secondly, the clock oscillator was re-designed as the 8044 required a clock capacitor of one half the value used in the 3043 chip. The 1 megohm symmetry trimmer necessary for the 8043 could (and should be removed).

## M Version

In 1980 the M version of the 8044 was introduced. These versions consisted of a speed indicating function to the circuit. The 8044 and 8044M were kept reasonably compatible by adding the required two new pins to the end of the package. This allowed the M version to sit in a socket designed for the plain 8044 just by allowing two pins on one end to overhang the socket. A 50 µA analog meter is used with the speed readout (Pin 12 of the IC). I will go into greater detail in part two.

## B Version

Two years later it became apparent there had developed two types of iambic keyer circuits (squeeze) keying. Type A already existed in the earlier ICs and the new type was designated type B. Basically, type B iambic is where a squeeze released during an element, say a dot or a dash, will cause another alternate element to follow the one being produced. Confused? Say you want to make the letter "C". You release during the second dash (or the space following) and the last dit will automatically transmit. Presumably, this further reduces the effort to produce some letters. This chip was designated 8044B.

## ABM Version

1986 saw the production of the new 8044ABM chip, a product of the latest design and processing technology available in the integrated circuit industry. This 20 pin IC rolled all the characteristics of the earlier models into a single IC package. I should bring to your attention that the 8044ABM is not pin compatible with the earlier designs. It does have

switchable type A and B iambic, switchable negative or positive weighting and an output for an analog speed meter as mentioned earlier. Capable of A or B iambic and Meter ready, we use the suffix "ABM" (see Fig 1 for pin connections).

The 8044ABM incorporates filters which eliminate the effects of key bounce on both make and break. Another invisible quality is RF immunity, to prevent false triggering by RF on the paddle leads. The dots and dashes inputs are equipped with active pull up resistors which exhibit only few hundred ohms impedance to the power supply when the key is opened.

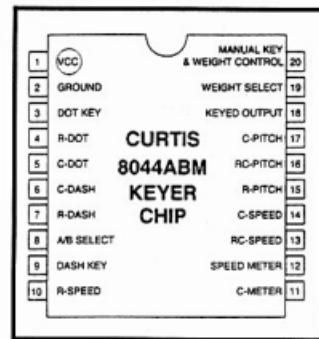


Fig 1.

## Electrical Specifications

Supply Voltage	4 V DC — 12 V DC max 5-9 V DC recommended
Quiescent Current	Less than 50 µA at 5 V DC
Operating Current	10-30 mA keydown
Speed Range	Unlimited using external R & C 6-50 wpm
Dot-Space-Dash Ratio	1: 1.3 standard, A or B iambic.
Weight Control	Weight can be + or - via the weight control pot
Sidetone Oscillator	Internal using external R & C.
Package	20 pin DIP

References:  
*The ARRL Handbook 1980-1994*  
*Curtis 8044 Series Information Book*  
*Curtis 8044ABM Application Note*

Next month we continue with the 8044ABM, having a closer look at its operating features. Until then I wish all readers of this column a very merry Christmas and a happy and safe New Year.

\*PO Box 361, Mona Vale NSW 2103

# **1995 WIA AUSTRALIAN RADIO AMATEUR CALL BOOK**

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# QSLs from the WIA Collection

Ken Matchett VK3TL\* Honorary Curator WIA QSL Collection

## POLAND - POZNAŃ

POLSKI ZWIĄZEK KRÓTKOFALOWCÓW  
Stacja ekspozycyjna pracująca w czasie wizyty  
Papieża JANA PAWŁA II w Poznaniu 1983 r.

# SNØJP

Occasional station working during visit  
Pope JOHN PAUL II in Poland 1983 ✓

Confirming	Two way	QSO NUMBER	RST	TRANSMITTER
RADIO	16	MHZ	75X	
HF GLNU	1025	UTC	Mode	
	21	June	SSB	
Remarks			Op.	STAN

Power by PALLISTERUM - Printed 10/08/1983 - R.10/1983



## SNOJP

No Pope in history has travelled so extensively as Pope John Paul II. The papal visit has been celebrated in several countries by the special issue of a QSL card to mark the occasion. Norway (special prefix LE3JP), XX3JP (Madeira Is), 6DAPAX (Mexico), VI3PVA and HG52JP (Hungary), to name just a few. Poland, the birthplace of the present Pope, has marked his visits with QSLs of various prefixes. The card (with its special suffix as well as prefix), celebrated the papal visit to Poland in 1983. Card donated by Radio Austria International.

## VK4FFG

This is a QSL of the club station of the Australian Naval Amateur Radio Society in Brisbane. It shows some of Australia's guided missile frigates (FFGs) namely the HMAS Adelaide, Canberra, Sydney and Darwin. Hence the significance of the FFG suffix in the call-sign. Club members feature some other Australian warships on their individual cards, including HMAS Vendetta, Australian destroyer HMAS Arunta and the frigate HMAS Barwon. Card donated by Terry VK2ALG, Hon Sec of the ANARS.

## VE9AL

Very few amateurs will have ever seen a Canadian QSL with the prefix VE9. This QST the station VE9CNE was featured as pre-war portable call-sign of station VE3AL. In the December 1935 issue of QST the station VE9CNE was featured as a special station set up for the Canadian National Exhibition of August and September 1935 at Toronto. Recently Canada has issued other prefixes with the nine numeral but they have been authorised for special events only, eg VY90R (Hamfest 1993), CG9ASJ (200th anniversary of the city of Saint John in New Brunswick), and VY9CC (20 years of communication). Card donated from Estate of A B Leonard of Drouin.

## CF25A

The call-sign CF25A is yet another uncommon one from Canada. It was a special call commemorating the 25th anniversary of the Canadian flag. The station was operated by the Maple Leaf Radio Society president VE3XN during February and April 1990. Card donated by Jim, operating as A51JS from Bhutan on his 1990 DXpedition.

## A-3AL

This was the pre-war call-sign of one of Australia's radio pioneers, Vernon Kerr. He spent over forty years as a technical officer with the Royal Flying Doctor Service operating out of such outback towns as Cloncurry, Charters Towers and Charleville. A member of the WIA, he was honoured with a life membership of that Institute. Further details can be found in the publication *Halcyon Days* by Alan Shawsmith VK4SS. Vernon went on the air in 1926 using the call A-3AL just a year before Australia started using its OA prefix (to be replaced by VK in 1929).

## CQ0VY

This particularly attractive multi-coloured QSL card from Portugal celebrated the country's presidency of the European Economic Community. It shows the flags of both Portugal and the EEC. The prefix CQ zero is a relatively new one for Portugal (CT was used exclusively for many years). Things changed in 1983 when the prefixes CQ, CR, CS and CU were issued. The CQ zero prefix is reserved for the celebration of special occasions. Card donated by Roth VK3BG.

AUSTRALIAN NAVAL AMATEUR RADIO SOCIETY  
Club Station - Brisbane, QLD



# VK4FFG





I obtained several 7815 regulator chips and measured their output voltages. Unfortunately, there was a surprising variation of as much as half a volt. However regulators from the same manufactured batch were within 100 mV of each other. If you can purchase regulators from the same manufacturer and the same batch, the power supply I came up with may be for you. Measure each regulator to be sure that they are all within 100 mV of each other.

Starting with a 7815 chip, the 15 volt output is dropped by 0.6 of a volt in the 1 amp diode, and with a 0.56 ohm resistor in series to help balance the current distribution between regulator chips, a 12 amp regulated supply was constructed that float charges a battery to 13.8 volts.

Note the large smoothing capacitor of 100,000  $\mu$ F. This may be on the high side but, as I had one, it was used. However,

with such a large capacitor the bridge rectifier may not like the large switch-on current surge so the 6.8 ohm resistor charges the capacitor until the relay R1 operates and shorts out the resistor. I found the relay would not operate unless there was a capacitor at the output of the bridge, hence the 5000  $\mu$ F.

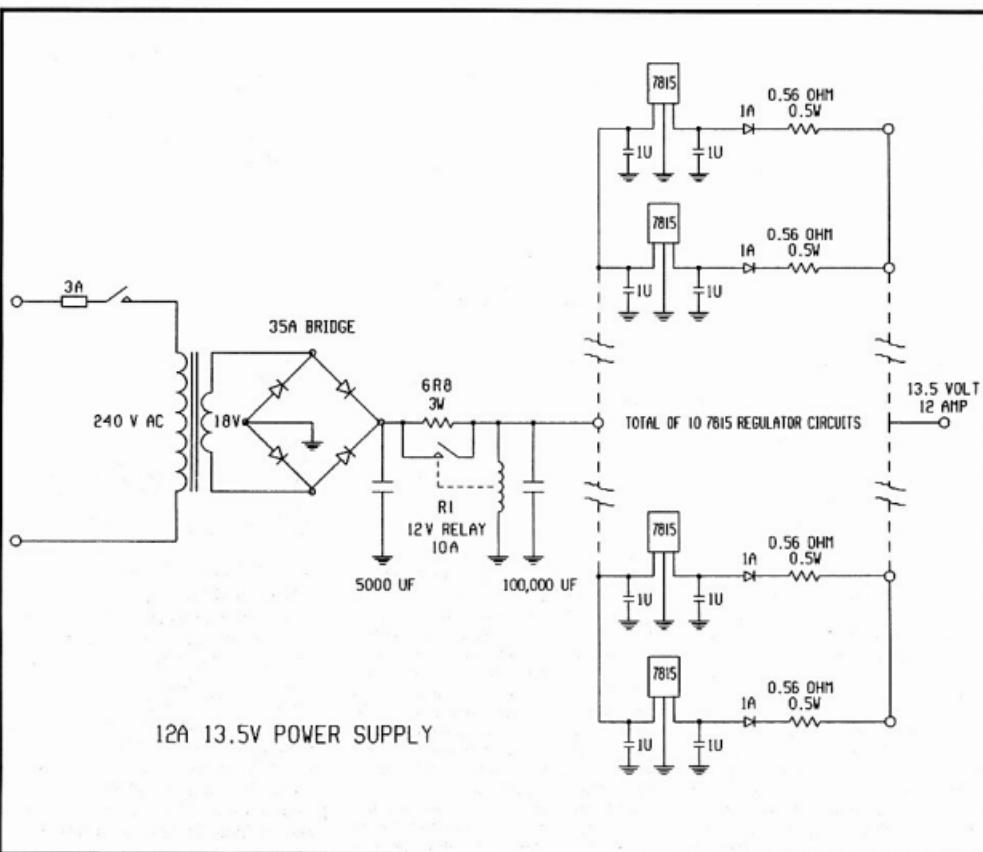
When calculating the size of the smoothing capacitor required in a power supply, there is a simple rule. For every amp drawn from a 10,000  $\mu$ F capacitor, there is 1 volt of ripple. If you double the capacitor to 20,000  $\mu$ F, then 1 amp will result in half a volt of ripple. With the 100,000  $\mu$ F capacitor shown, and the supply providing 12 amps, the ripple voltage will be 1.2 volts. The 7815 regulator requires a minimal 2 volt differential between input to output to regulate. For the 7815 the input voltage must not drop below 17 volts at the bottom.

of the ripple. If it does the output will contain 100 Hz hum. This may or may not be a problem when floating a battery but it is best avoided. Even a small amount of hum across a battery supply at a repeater site can find its way into equipment.

The 7815 chips require heat sinking and this is made easier as no insulation is required between the mounting surface and earth. Note the  $1\ \mu F$  capacitors on each input and output of the 7815s. Without these capacitors the 7815 may become unstable.

I could go on with further thoughts on the power supply but I already have used a large slice of *Amateur Radio*. If you have any queries on the power supply, or decide to use the idea, I can be contacted as shown below.

\*21 Waterloo Cr Lesmurdie 6076 VK6UU @ VK6BBS



# Spotlight on SWLing

Robin L Harwood VK7RH\*

1994 is rapidly coming to a conclusion. Over these past twelve months we have had severe reception difficulties mainly because of the low sunspot count. The higher frequencies above 15 MHz were virtually unusable, whilst propagation on the lower frequencies was marginal to fair quite often. Although, as I'm writing this, the higher frequencies are exhibiting some activity around 1100 UTC, but this is rather temporary, I feel.

Many international broadcasters have had budgetary cutbacks, affecting programming and/or transmission output. Radio Moscow International has increasingly begun cutbacks to the extent that they are now using only 38 languages compared to about 60 at the height of the Cold War. Also, the English World Service has also reduced their transmitting output. I have noted several e-mail messages on the Shortwave Echo complaining of the difficulty in finding Moscow, especially in North America.

Some stations have disappeared from the spectrum altogether. Radio KGEI in San Francisco closed down in the middle of the year. This religious broadcaster mainly beamed into Latin America in Spanish. Another religious broadcaster, WCSN in Maine, ceased operating in October as part of the "Christian Science Monitor" network. The sender was sold about a year back to a Florida based Adventist group which is not connected to Adventist World Radio. A callsign change was mooted but I haven't heard the station since the new owners took full possession. The popular "Swiss Shortwave Merry-go-round" DX show on SRI with the two Bobs, Messrs Zanotti and Thomann, also was axed in June. There was an e-mail outcry about Swiss Radio International over this, trying to have the program re-introduced.

Despite the budgetary gloom, some broadcasters actually increased their output and influence. Radio France International is reportedly increasing the number of languages aired and is investing in additional transmitting sites in Thailand and in Africa. They have recently completed the upgrade of their French sites. The other growth area, particularly in the US, seems to be the increasing number of private religious broadcasters. To get a clear channel, many of these stations are operating well outside the normal broadcasting allocations. This has caused some interference to other spectrum users who are legitimately allocated these

frequencies by their administrations. Diplomatic protests to the American FCC have had limited success. WEWN and WSHB were forced to move off some 5 MHz channels following SMA protests that they were interfering with our RFDS communications network. Despite this, WWCR has now appeared on 5065 kHz up until 0800 UTC, and again from 1200 UTC, with "Brother Stare". The frequency choice hasn't gone down well with tropical band DXers, either.

And while I am on tropical band DXing, I recently heard a new country between 2045 and 2107 UTC. Nairobi was logged on 4935 kHz with American country & western music followed by a time check indicating it was midnight locally. Before signing off, news headlines in English were heard, followed by a Christian religious devotional. However, I found the pronunciation impossible to follow as the signal rapidly faded.

I also note that the General Overseas Service of All India Radio in Delhi, directed to Oceania, is being heard quite well now at 1050 UTC on 15180 kHz. For many years it has been rather difficult to hear AIR at this time but they have upgraded their facilities and installed new additional senders near Goa and Bangalore. Their modulation has vastly improved. Other frequencies used at this time are 15050 and 17387 kHz. Radio Pakistan in Karachi, on the other hand, are on 7085 kHz variable in local languages and English from 1030 UTC, yet their modulation is terrible as is their frequency stability. Naturally, they are in the exclusive amateur allocation but it may be a transmitter spur from 7310 kHz which is in parallel, yet Karachi has had a registration on 7085 with the ITU for some time.

Don't forget that around the Christmas New Year period, several special broadcasts are planned. The "Festival of Nine Lessons and Carols" will again be on Christmas Day at around 0935 on the BBC World Service. One of my Tasmanian cousins was privileged several years back to attend this live. She confirmed that it indeed is pre-recorded about a week prior to Christmas in King's College Chapel in Cambridge. Midnight Mass from St Peter's Basilica in the Vatican is also available on shortwave. However, I find that the relay via WEWN is better than direct from Vatican Radio.

Don't forget that on 5 January, the Orthodox Christmas is celebrated. This is due to the Orthodox communion still

being on the Julian calendar, while the majority of western churches are on the Gregorian calendar.

Also, don't forget the major ocean yacht races after Boxing Day. Not only do the Sydney-Hobart and Melbourne-Hobart races conduct their communications on HF, but also races between Queenscliff and Devonport plus Sydney to Coffs Harbour and Southport (QLD), are staged over the same period. It is a very hectic time on the channels of 4483, 2524, 2182 and 8711 kHz. The calling channel is either 4125 or 2182 kHz. All use USB.

In conclusion, may I extend my wishes for Christmas and hope that 1995 will bring in more peace and stability than we have had over this past 12 months. If you have any news, don't forget my e-mail address or Packet BBS is there. Take care and good monitoring!

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VK7RH@VK7BBS.LTN.TAS.OC

Internet: roboay@clarie.apana.org.au

Fidonet : Robin.Harwood 3:670/312

ar

## Update

### Beam Antennas With Bent Elements — Part 2

The author of this two part article, John Sproule VK2AGT, has advised us that there was a minor error in a statement two thirds of the way down column two on page four of the September issue of Amateur Radio.

The statement  $\text{If } \theta_{12} < 45 \text{ deg, then } \cos 2\theta_{12} \text{ is positive and therefore } R1 = R11$ . This is for a Yagi. Should read  $\text{If } \theta_{12} < 45 \text{ deg, then } \cos 2\theta_{12} \text{ is positive and therefore } R1 < R11$ . This so for a Yagi.

It might be a good idea to correct your copy of the September 1994 issue of Amateur Radio now.

## WIA News

### World Radio Sport Championship

Just in case you were thinking of joining in the fastest growing aspect of this hobby around the world — amateur radio direction finding (ARDF) — the deadline for teams entering the 1995 World Radiosport Team Championships has been extended to 28 February, 1995. The event will be held in Washington, DC, in the United States (see October WIA News).

# VHF/UHF — An Expanding World

Eric Jamieson VK5LP\*

All times are UTC

I hope last month's columns were not too much of a culture shock but at least you now know a little more about what makes me tick! It was unfortunate that space restrictions meant many interesting snippets of amateur radio activity, particularly during the AM days and portable operation, had to be omitted. However, my notes only make a portion of an interesting magazine and as such I am fortunate to be allowed the space that is available each month.

## Australian News

John VK3ATQ sent a fax to say that between 2115 and 2130 weekdays there is activity on 50.115 MHz. John and Rupert VK3BJN are both in Melbourne and have regular contacts with David VK3DY at Maffra, Lloyd VK3KFO at Briagalong, and John VK3BQS at Sale. As the latter three have their beams pointing west John suggests stations in VK5 may hear them. The short time slot is necessary due to work commitments but they would welcome other contacts particularly from country stations.

From Port Pirie, Neil VK5ZEE sent me a packet message via Garry VK5ZK to the effect that recently he re-activated his callsign and is now active on 50, 144 and 432 MHz chasing SSB contacts. He is attempting to start a nightly net on 144.125 at 0945 and 432.125 at 1015. Contacts so far have been to VK5BWG at Port Augusta and VK5KK in Adelaide and others would be welcome. The Adelaide two metre beacon is a fairly constant S3 but the 432 beacon has not been heard.

Neil runs 10 watts on six to a 5 element beam, on two an output of 80 watts to a 13 element horizontally polarised antenna; also a 20 element crossed Yagi fitted with an elevation rotator for satellite use. On 432 he has 35 watts to two 27 element horizontal KLMs and an 11 element vertically polarised antenna. His aim is to eventually erect 4 x 13 elements for two metres EME contacts.

In the October issue of *Amateur Radio* my columns included a copy of Steve Gregory's (VK3OT) ARRL DX Century Club Award for six metres, the only one issued to an Australian amateur. In addition I have received copies of two additional certificates awarded to Steve; they are from the UK Six Metre Group, the first for working 100 countries on 50 MHz and the second the Worked All Europe Award for contacts with 20 European

countries on 50 MHz all by using CW. Good work Steve.

Mark VK5AVQ ex-VK0AQ, advises that he has checked the VK5VF beacons and found six metres was OK, the two metre beacon frequency was corrected as it had drifted slightly. The 70 cm beacon antenna was broken so temporary repairs were affected but the high SWR may have damaged the unit so it will need an overhaul. The 1296 beacon is still absent.

Mark has lumbered himself with the job of rebuilding the 70 cm repeater again (!) after which he plans to construct 10 GHz equipment for his own use. Sandwiched somewhere will be time to re-erect his six metre antenna in readiness for the Es season.

A note from Steve VK5AIM drew my attention to a paragraph in the VK5 Journal in the August issue of *Amateur Radio* which announced that Adelaide's first six metre repeater is being tested. When ready the South Coast Radio Club will install the FM repeater on Chandlers Hill. Transmit frequency is 53.750 and receive 52.750 MHz. I hope to be advised

when the repeater is fully operational so that readers throughout Australia will know of its existence.

Steve also sent information from *Radio Communication* for June 1994 indicating that Rex VK8RH has built a beacon to be operated from Jakarta in Indonesia on 50.042 MHz with the callsign YBOZZ. No other details are available.

## Contests

The Ross Hull Memorial VHF-UHF Contest commences at 0000 Monday 26 December 1994 to 2400 Saturday 28 January 1995 and all bands above 30 MHz may be used. Single operator only and one contact per station per band per UTC day. RS or RST numbers plus a three-digit serial number to be exchanged plus location or Maidenhead locator of station worked — this to allow for the computing of distances.

Logs must be received by Monday 20 February 1995 and should be posted to: WIA Ross Hull Contest Manager, PO Box 2175, Caulfield Junction, VIC 3161.

The above is a very brief outline of the contest mainly to draw your attention to it. Full details were published on page 34 of last month's issue of *Amateur Radio*. The Contest Manager makes the usual request that DX calling frequencies should be kept clear as much as possible.



From left: Geoff GJ4ICD/JY8IC, Mohammad JY4MB, Nick G3KOK/JY8OX, HRH Prince Raad JY2RZ and Neil GOJHC/JY8JH in the JY7SIX shack housed in the Marriott Hotel, Amman, Jordan.

Print courtesy of GJ4ICD.

The 1995 VHF-UHF Field Day will take place on 14/15 January 1995 and will run in parallel with the Ross Hull Contest with rules much the same as in previous years (see the Contests column in this issue of *Amateur Radio*).

Doug VK4OE telephoned to say he would be operating in the Field Day Contest from a suitable site near Dorrigo in northern NSW on all bands from six metres to 2304 MHz. Given reasonable conditions he expects contacts to Sydney and Brisbane on 144 and 432 SSB to be relatively easy and special attention will be given to 1296 MHz. If conditions and circumstances permit he will try 2304 MHz with anyone so equipped.

He will be calling and listening on 144.100, 432.100 and 1296.100 and will shift up 15 kHz on each band for any sustained operating. On 50 MHz the frequency will depend on band conditions and there should be no problems with Es contacts. If Doug cannot be reached on 144 or 432 then you might try telephoning him on 018 191 066 while out in the field!

## Overseas News

From the same publication is a Locator Squares Table which shows G3IMV at the top with 1139 squares comprising 434 on 50 MHz, 15 on 70, 513 on 144, 125 on 430 and 52 on 1.3 GHz. He is closely followed by Geoff GJ4ICD with 611 on 50, 1 on 70, 264 on 144, 121 on 430 and 68 on 1.3, for a total of 1065 squares. In addition there are 15 operators with scores above 500 squares. All this indicates what can be done when you live in a region with a high

density of amateur radio operators spread over a large area.

In a letter from Neil G0JHC received in June I missed an interesting point. He said that the day after returning from a stint at operating JY7SIX, the Jordanian DXpedition station, he managed to work the station. He mentioned the station has been heard several times over the 4000 km distance. The Jordanian beacon is JY6ZZ and operates on 50.075 MHz. It was built and donated by Lawrence GJ3RAX and Geoff GJ4ICD.

But then Neil writes that on 10/6 JY7SIX worked into North America on multi Es at over 10,000 km! That's a long haul for Es with at least four hops involved and this is rare indeed. I will try and obtain more details of the contact/s and report later. Also, see photograph.

Ted Collins G4UPS reports that Leif Johansen LA9ZV, became a Silent Key on 30/8 as the result of a heart attack at the age of 49 years. Many stations in Australia would have worked Leif on six metres. Also, George Heeringa PA0FM became a Silent Key on 19/8 at the age of 73 years. George will be remembered also for his operation on six metres as P43FM.

Ted also provides an interesting comment on the state of six metres in the UK. *Has it been a good or bad season? Although there have been very few openings across "the pond", from here in Devon I have worked/heard 65 countries since 1 January 1994 up to 15 August. Several countries like ZD8 are included as heard because only the beacon is operational. I guess newcomers will feel*

very pleased to have more than 60 countries worked in such a short space of time! Indeed...VK5LP.

## From the USA

Emil Pocock W3EP in his World Above 50 MHz in QST for October 1994 has the news for which I have been waiting. That concerns the monumental contacts which occurred from 11 to 14 July 1994 when so many bands opened from USA to Hawaii, in the process setting two world records. I had known for some time that the spanning of that path had occurred but was lacking details. Let Emil tell you about the interesting occurrence.

The reliable transpacific duct outfit itself this season, replacing sporadic-E doings as the lead story for July. Jack Henry N6XQ called the session "the grandaddy of all 2 metre Hawaii openings". Not only did stations from Oregon to Mexico make contact with the islands on two metres, but the first 2304 MHz Hawaii-to-California QSO was completed and the 902 MHz record extended. Excited stations on both ends of the path made hundreds of contacts on 144 through 1296 MHz, many of them on FM and through FM repeaters.

As usual, the KH6HME beacons atop Mauna Loa, Hawaii (BK29go) gave California the first inklings that the duct had formed across 4000 km of Pacific Ocean. N6XQ (DM12) in San Diego heard the two metre beacon weakly on July 3 and 5 and it was loud enough on the 9th to alert the Hawaiians. N6XQ and KH6FOO made a contact soon after. By the 11th Jack heard the Hawaiian beacon at 20 dB over S9 as Paul Lieb, KH6HME himself, arrived on top of the mountain around 2000Z to begin a hectic two days of operating.

Stations all along the West Coast were waiting and when Paul made his first call on 144.170 MHz he was swamped with frantic S9 mainland stations and the pile-up remained throughout the day and into the next. By the time the opening died out on the 13th, Paul had filled 16 pages of log, including 148 QSOs on 144 MHz, 6 on 222 MHz, 29 on 432 MHz and 3 on 1296 MHz. Paul made only one contact each on 902 and 2304 MHz but both were record-breakers.

N6XQ and KH6HME finally made it on July 13 at 2240Z to extend the transpacific 902 MHz tropo record to 4060 km. Paul's 12 W signal from a short loop Yagi was 529 in California, while Jack's 15 W to a 22 element Yagi was received 519 on the big island.

In the midst of all the excitement on the lower bands, Chip Angle N6CA set up his microwave equipment at the Palos Verdes City Hall near Los Angeles and at 2321Z

## WIA News

### Voice Repeater for MIR Space Station

An upgrade planned for the Russian MIR space station, a popular platform for amateur radio in space activities, should see a 2 m to 70 cm FM voice repeater operational within the next two years, according to a report from 12th Annual Meeting and Space Symposium of the Radio Amateur Satellite Corporation (AMSAT-NA). Held in Florida, USA, in early October, the symposium marked the 25th anniversary of AMSAT.

Other developments outlined at the Florida meeting covered progress on planning for the "Phase 3D" satellite. Due for

launch in mid-1996, Phase 3D will be the largest, and most complex amateur satellite ever assembled.

Among the array of ground-to-satellite (uplink) channels planned is one in the 21 MHz (15 m) HF band. Others will be in the various VHF, UHF and microwave bands. Assembly of the Phase 3D satellite is proceeding on schedule, it was reported. It will be about 2.1 metres in diameter. Meanwhile, it seems the popular OSCAR 13, on which many amateurs "cut their teeth" in amateur space communications, is fated for a fiery death in early December when it is scheduled to re-enter the atmosphere. Thanks to the ARRL Newsletter for details.

on July 11 Chip made a 2304 MHz contact with KH6HME for the first Hawaii-to-California contact on that band. The distance was 3979 km. Both stations ran 12 W to 4 foot dishes. Signal reports were 559 both ways.

Unusually strong signals gave some hope that contact could be made on 5760 MHz and 10 GHz as well, but these efforts were not successful with a number of stations spending many hours trying to span the Pacific on 10 GHz, despite the booming signal on 1296 MHz. The wide coverage of the opening was remarkable. Several other Hawaiian stations participated with 144 and 432 SSB/CW gear. KH6HME also worked XE2EED (DM12) in Tijuana, Mexico. The opening extended as far inland as Reno, Nevada.

Hundreds of contacts were also made on two metre FM, both direct and through Hawaiian repeaters, most notably the 147.040 machine on Mauna Loa. Many mobile and even hand-held stations spanned the 4000 km to Hawaii.

KH6HME also made the first successful ATV transmission from Hawaii to California on 440 MHz using 100 watts with the

signal peaking to P4 (nearly snow-free). Paul's equipment was not configured for reception so an ATV two-way could not be made at that time.

Bruce KK6TG, one of those who tried to make the grade on 10 GHz, went up and down the mountains on July 12 and 13 in the Bay area making measurements of signal levels from Hawaii. He found that signal strength rose gradually from sea level to 600 feet and then held constant until about 3500 feet. Bruce saw an extremely sharp inversion boundary, visible as a layer of dark smog, cutting through distant Mount Diablo at about 3800 feet. At 4300 feet he could not hear KH6HME at all. This suggests that the responsible inversion lay just over 3500 feet (1100 metres) altitude in the Bay area, entirely consistent with observations of similar transpacific ducts.

Well, that 2304 MHz contact puts paid to the record held by Reg VK5QR and Wally VK6WG since 17 February 1978 at 1883 km and dashed my hopes of extending the distance to 2000 km by working VK6WG from Menningie. I think the only world record we still hold is the 144 MHz contact on 15 April 1991

between VK4BFO and JI7DMB at a distance of 6763 km but I am open to correction.

### Closure

There is little else to report other than to say that if normal circumstances prevail then Es should be excellent particularly during late November through to early January. Be mindful of two metre contacts when Es conditions are at their best.

Thank you to those who have supported this column during the year by forwarding information. Best wishes to everyone for a happy Christmas and may the New Year be as you would like it.

Closing with two thoughts for the month:

1. Success is being able to hire someone to mow the lawn while you play golf for exercise, and
2. The pain in the neck you complain about may be the result of looking backwards.

*73 from The Voice by the Lake.*

\*PO Box 169, Menningie SA 5264  
FAX: 085 751 043 Packet to VK5ZK for VK5LP

ar

## Technical Correspondence

All technical correspondence from members will be considered for publication, but should be less than 300 words.

### Interfering Telephone

I have recently suffered from interference to reception on 80 metres which was caused by a neighbour's cordless telephone when hung up! The phone in question was a Telephone Tech CT630.

The interference took the form of a mixture of local broadcast stations appearing at spots around 3.5 MHz, the loudest being on 3447 kHz at S9. There were other signals spaced every 9 kHz.

My station is only 5 km from the local AM broadcast transmitters and the telephone lines are overhead. Apparently the phone line was picking up the broadcast stations and the phone mixing them. The interference was not audible at a friend's house about 300 metres away.

I tried installing an Amidon FT-140-77 ferrite core with 21 bifilar turns as a common mode choke and reduced the interference from S9 to S4. A pair of 2.5 mH RF chokes in series with the line removed the interference completely.

However, the solution finally adopted was for me to repair the plug pack used

with my neighbour's previously defunct phone and restore it to service. The offending phone was returned to K Mart for a full refund.

I was unable to contact the manufacturers of the phone, their only contact information being a telephone

number, now disconnected. Also, I was unable to find a supplier of approved RF filters for use with telephones.

**Richard Rogers VK7RO**  
15 Coolamon Road  
Taree TAS 7053  
ar

## Silent Keys

*Due to space demands obituaries should be no longer than 200 words.*

The WIA regrets to announce the recent passing of:-

J G (Geoff)	MYERS	VK2UA
J L C	HART	VK3BJY
T N	BROWNLOW	VK5NAF
V D (Doug)	HUMBLE	VK6NDJ
H J (Harold)	BRACKEN	VK7BR
R (Rick)	BRAY	VK7ZZ

### John Geoffrey Myers VK2UA

We regret to announce the passing in early October of John Geoffrey Myers VK2UA. First licensed in 1938 as 21Y, Geoff was a founding member of the Manly-Warringah Club (now the Manly-Warringah Radio Society, of which he was a life member).

Born at Neutral Bay, Sydney, in 1913, Geoff was the first President of the Zero Beat Club and a member of the Harrington's Radio Club. He served with the Australian Armed Forces from 1939 to 1945 as Captain, and later company Commander, with the 4th Division Signals in New Guinea.

After a break of some years, Geoff was re-licensed as VK2UA in 1978 and maintained a keen interest in amateur radio until his passing at age 81. Geoff will be greatly missed by his family and many friends in amateur radio.

**Richard Murnane VK2SKY**, on behalf of the Manly-Warringah Radio Society  
ar

# What's New

Bob Tait VK3UI\* introduces new products of interest to radio amateurs

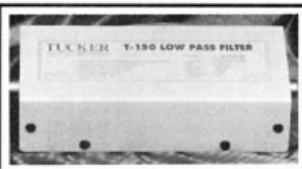
## New Low Pass Filters from Tucker

### Tucker T-100 1500 Watt Low Pass Filter.



Every radio shack should have a low pass filter to insure against problems of TVI from harmonics. The new Tucker T-100 utilises a 9 pole Chebyshev design with a cut-off frequency of 35 MHz. Attenuation at 40 MHz is -70 dB and -60 dB at 65 MHz worst case. The insertion loss is 0.25 dB at 30 MHz with an SWR of less than 1.5:1 and an impedance of 52 ohms. This unit is rated at 1500 watts continuous, and comes with a 1 year warranty. Not bad for \$US49.95

### Tucker T-150 2500 Watt Low Pass Filter.



Tucker claim that this is the first 2500 watt low pass filter on the amateur market which is designed to work with high power linear amplifiers. The specifications are the same as its smaller brother but with a higher power rating. The price for this unit is \$US109.00

Both units are available direct from Tucker Electronics and Computers, PO Box 551419, Dallas TX 75355-1419, USA; Fax 214 348 0367

**Have you advised the WIA Federal Office of your new Callsign? Use the form on the reverse side of the Amateur Radio fliesheet.**

## Now Hear This! An Audio Booster for your Handheld.



Marvel Electronics Inc have released the HTS-2 audio booster for your handheld transceiver. It comes complete with an internal battery supply and charger unit. A special battery saver circuit shuts off the audio, reducing the battery drain to 1 milliamp, whenever your handheld is squelched for more than 10 seconds. The amp turns on again the instant the squelch opens to produce 1.4 watts into a 3.5 inch oval speaker. A small LED indicates battery saver mode.

A DC power jack and voltage regulator allow you to operate the HTS-2 from external voltage sources (5-15 VDC), or from a standard wall pack. The internal batteries are charged from the external power source. The HTS-2 can accept either + or - ground inputs, so there are no problems about getting it wrong. The unit also has bypass mode and comes complete with 1.5 metres of audio cable. Check these specifications:-

Frequency range	200 — 15,000 Hz.
Input impedance	Variable (100 Ω nominal)
Maximum input	400 mV
Output power	1.4 watts at 4 Ω
Size	69.8 mm x 114.3 mm x 63.5 mm
Weight	2.2 kg
Colour	Silver/Grey

The HTS-2 is available from ZRV Electronics Pty Ltd, PO Box 469, Eltham VIC 3095. Ph (03) 439 3389 or Fax (03) 439 2483 for further details.

## NIR-10 Digital Noise and Interference Reduction Unit.



The NIR-10 is designed to connect to the audio output jack of your receiver/transceiver to enhance the received audio quality of voice and CW signals. Using advanced Digital Signal Processing Techniques (DSP) the unit is able to recognise SSB signals and improve the signal to noise ratio.

Unlike conventional audio bandpass filters, the NIR-10 can actually remove those annoying noises and heterodynes without affecting the speech itself.

There are 4 modes of operation: NIR to reduce or eliminate, heterodynes, white noise, ignition noise, RTTY interference and power line noise; PK (peak) function to reduce white noise (this can be used alone or in conjunction with the NIR mode);

NF (notch filter) mode, which removes multiple heterodynes and acts in 3 microseconds; and

BP (bandpass) mode — the centre frequency is continuously adjustable, it provides selectable bandwidth, extremely steep skirts, and greater than 60 dB rejection.

A Bypass mode removes all processing delay, but allows the Peak and Notch functions to be used in real time. Connections on the rear panel allow the unit to be bypassed whenever the transmitter is keyed. The NIR-10 is powered from a standard 12 volt DC supply and consumes 1 amp peak. A volume control mounted on the front panel adjusts the output level of the built-in audio amplifier and the output is 2 watts into a 3.2 Ω load. A convenient phone jack is also provided.

For further information contact: ZRV Electronics Pty Ltd, PO Box 469, Eltham VIC 3095. Ph (03) 439 3389 or Fax (03) 439 2483.

\*C6 PO Box 2175, Caulfield Junction VIC 3161

# HF PREDICTIONS

Evan Jarman VK3ANI

## The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for five of the bands between 7 and 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1  $\mu$ V (dBu) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1  $\mu$ V in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50  $\mu$ V at the receiver's input and the S-meter scale is 6 dB per S-point.

V in 50 ohms	S-points	dB( $\mu$ V)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4

0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

**VK EAST** The major part of NSW and Queensland.

**VK SOUTH** Southern-NSW, VK3, VK5 and VK7.

**VK WEST** The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used in these calculations is 22.0. The predicted value for January is 20.7.

## VK SOUTH — SOUTH PACIFIC

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	17.8	19	14.4	-6	23	19	12	1
2	18.1	19	14.9	-8	23	19	12	1
3	18.1	19	14.9	-5	24	20	13	1
4	18.1	19	14.9	-9	20	13	12	1
5	18.0	21	14.7	8	27	21	13	1
6	17.9	23	14.6	16	30	22	14	1
7	18.1	25	14.7	31	34	25	16	2
8	17.9	27	14.5	45	37	26	16	2
9	18.2	29	14.6	50	39	26	13	3
10	16.8	29	13.3	37	26	23	10	3
11	16.2	30	13.0	53	36	23	10	3
12	15.5	30	12.4	53	35	20	7	-11
13	15.0	31	11.9	53	34	18	4	-15
14	14.4	30	11.2	52	31	14	1	-33
15	13.3	29	10.2	51	27	11	1	-9
16	12.4	33	9.4	50	24	3	-16	—
17	12.3	33	9.4	50	24	3	-16	—
18	12.1	31	9.1	44	22	2	-17	—
19	12.6	25	9.5	26	20	4	-12	-35
20	14.2	22	10.5	14	22	10	2	-21
21	15.9	21	10.0	5	23	15	5	-9
22	17.6	19	13.7	-5	23	18	11	-1
23	17.6	19	13.7	-5	23	18	11	-1
24	17.8	19	14.2	-8	23	18	11	0

## VK WEST — SOUTH PACIFIC

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	21.7	16	17.2	-16	19	16	10	10
2	21.7	15	17.5	-16	19	16	10	10
3	22.0	16	16.3	-17	19	17	11	11
4	22.0	15	16.1	-37	20	17	11	11
5	21.9	16	17.9	-17	23	23	19	12
6	21.8	20	17.7	0	28	26	21	13
7	22.0	22	17.9	18	33	29	24	15
8	21.8	24	17.9	33	37	31	25	16
9	21.8	25	17.9	44	40	32	25	15
10	21.2	25	17.9	44	40	32	25	15
11	20.5	25	16.8	45	39	31	23	11
12	19.8	25	15.8	50	40	31	23	11
13	18.9	26	15.0	52	40	30	21	8
14	18.3	26	14.4	51	39	29	19	6
15	17.2	29	13.3	51	37	26	15	1
16	15.9	30	12.2	50	35	22	11	5
17	14.9	31	11.1	49	39	21	11	10
18	14.8	30	11.2	46	32	19	6	-16
19	14.7	26	11.1	30	28	16	4	-11
20	15.4	22	11.5	11	24	16	6	-7
21	17.3	19	13.6	-6	22	18	11	0
22	19.5	17	14.7	-21	20	19	15	6
23	21.0	17	16.1	-32	19	20	16	5
24	21.4	16	16.7	-38	17	19	16	10

## VK EAST — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	11.8	13	13.2	-11	13	10	4	4
2	11.8	13	13.2	-11	13	10	4	4
3	14.5	15	13.0	-15	17	15	10	10
4	16.7	16	12.6	-2	22	18	12	12
5	19.2	7	13.4	-2	4	19.2	11	11
6	19.0	7	13.3	-2	5	19.0	11	11
7	13	7	13.3	-2	6	19.1	9	9
8	19.0	7	13.3	-2	7	19.0	9	9
9	19.0	9	13.3	-2	8	19.5	10	9
10	18.9	10	13.2	-2	10	19.3	11	11
11	18.8	11	13	10	3	18.9	13	10
12	18.1	13	13.2	-11	13	13.3	-11	10
13	17.3	13	13.2	-15	17	13	10	10
14	16.8	20	12.8	-3	23	18	10	0
15	16.1	24	12.3	-24	18	10	-3	-1
16	15.2	27	11.7	-35	29	18	8	-7
17	14.4	28	11.1	-40	29	17	-9	-11
18	13.9	30	10.6	-43	29	17	-11	-13
19	13.9	30	10.6	-43	29	17	-11	-13
20	14.4	30	9.9	-46	30	17	-11	-13
21	13.7	30	9.9	-46	30	17	-11	-13
22	13.4	23	10	-16	21	14.7	-27	10
23	13.5	18	9.3	-2	17	8	-1	-16
24	14.1	15	9.8	-16	15	9	-12	-16

## VK SOUTH — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	14.1	20	10.8	-6	20	10	0	-16
2	14.5	20	12.5	-3	25	16	0	-14
3	14.5	16	12.7	-32	15	15	11	2
4	13.7	13	12.7	-17	19	16	10	10
5	13.7	13	12.7	-17	19	16	10	10
6	14.6	20	15.5	0	22	17	10	-1
7	14.6	20	15.5	0	22	17	10	-1
8	15.1	24	11.2	21	27	19	10	-2
9	15.1	24	11.2	21	27	19	10	-2
10	15.1	24	11.2	21	27	19	10	-2
11	15.1	24	11.2	21	27	19	10	-2
12	15.1	24	11.2	21	27	19	10	-2
13	15.1	24	11.2	21	27	19	10	-2
14	15.1	24	11.2	21	27	19	10	-2
15	15.1	24	11.2	21	27	19	10	-2
16	15.1	24	11.2	21	27	19	10	-2
17	15.1	24	11.2	21	27	19	10	-2
18	15.1	24	11.2	21	27	19	10	-2
19	15.1	24	11.2	21	27	19	10	-2
20	15.1	24	11.2	21	27	19	10	-2
21	15.1	24	11.2	21	27	19	10	-2
22	15.1	24	11.2	21	27	19	10	-2
23	15.1	24	11.2	21	27	19	10	-2
24	15.1	24	11.2	21	27	19	10	-2

## VK WEST — AFRICA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	18.2	16	18.1	-7	37	26	12	12
2	18.1	16	18.1	-7	37	26	12	12
3	18.1	16	18.1	-7	37	26	12	12
4	18.1	16	18.1	-7	37	26	12	12
5	18.1	16	18.1	-7	37	26	12	12
6	18.1	16	18.1	-7	37	26	12	12
7	18.1	16	18.1	-7	37	26	12	12
8	18.1	16	18.1	-7	37	26	12	12
9	18.1	16	18.1	-7	37	26	12	12
10	18.1	16	18.1	-7	37	26	12	12
11	18.1	16	18.1	-7	37	26	12	12
12	18.1	16	18.1	-7	37	26	12	12
13	18.1	16	18.1	-7	37	26	12	12
14	18.1	16	18.1	-7	37	26	12	12
15	18.1	16	18.1	-7	37	26	12	12
16	18.1	16	18.1	-7	37	26	12	12
17	18.1	16	18.1	-7	37	26	12	12
18	18.1	16	18.1	-7	37	26	12	12
19	18.1	16	18.1	-7	37	26	12	12
20	18.1	16	18.1	-7	37	26	12	12
21	18.1	16	18.1	-7	37	26	12	12
22	18.1	16	18.1	-7	37	26	12	12
23	18.1	16	18.1	-7	37	26	12	12
24	18.1	16	18.1	-7	37	26	12	12

## VK EAST — ASIA

UTC	MUF	dBu	FOT	7.1	14.2	18.1	21.2	24.9
1	19.8	14	15.8	...	14	16	12	5

VK EAST — EUROPE												VK SOUTH — EUROPE												VK WEST — EUROPE											
UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9									
1	9.3	-2	7.3	21	0	-13	-30	...	1	10.0	4	7.7	-1	-5	-24	...	1	10.5	13	8.1	3	5	-13	-32	...										
2	8.3	-2	7.2	-24	-1	-15	-35	...	2	8.5	-12	7.7	-29	-1	-14	-50	...	2	8.9	-4	7.0	-21	-1	-18	-37	...									
3	9.9	-15	6.2	-26	-1	-15	-32	...	3	9.6	-10	7.3	-29	-1	-13	-39	...	3	10.3	-3	7.8	-34	-1	-10	-48	...									
4	8.8	-13	6.8	-35	0	-11	-25	...	4	10.6	6	16.5	3	13.3	-	0	3	1	-7	-	6	18.0	6	14.5	2	5	3	-4							
5	11.4	-4	9.0	...	1	-4	-13	-29	...	5	12.6	-10	10.1	-	-	-	0	-1	6	-21	5	13.7	-	2	10.9	-	8	-21							
6	14.9	2	11.9	...	1	2	-2	-13	...	6	16.5	3	13.3	-	-	-	0	3	1	-7	-	6	18.0	6	14.5	2	5	3	-4						
7	17.9	6	14.3	...	3	6	4	-3	...	7	19.5	6	15.7	-	-	-	1	6	5	-9	7	21.2	7	17.1	-	1	8	7							
8	20.3	9	17.3	...	10	8	5	-4	...	8	20.3	8	14	-	-	-	6	8	5	-5	8	19.1	7	16.9	-	9	10								
9	18.8	12	17.7	...	12	3	7	-	...	9	21.6	7	17.5	-	-	-	8	9	5	-5	9	24.8	7	20.2	-	2	11								
10	22.6	16	17.9	-14	23	22	18	11	...	10	21.3	14	17.2	-	-	-	8	14	10	-10	10	24.6	11	20.0	-	5	13								
11	22.3	18	18.0	13	30	26	21	12	...	11	20.8	17	16.7	-37	18	19	17	11	11	24.0	12	19.9	-	11	16										
12	21.3	20	17.1	30	34	27	20	10	...	12	20.1	22	16.1	2	28	25	20	12	12	23.3	15	18.8	-22	21	22										
13	19.4	22	15.5	38	34	25	16	4	...	13	19.4	23	15.5	30	33	26	19	8	13	22.0	17	17.6	16	30	25	19									
14	15.5	24	14.3	42	31	19	7	-3	...	14	15.5	31	15.3	37	31	21	11	-3	14	18.2	19	17.6	16	32	23	14									
15	13.7	26	10.9	43	24	7	-8	-31	...	15	14.5	25	11.5	41	21	11	-3	15	15.9	23	12.5	38	28	15	3	-14									
16	11.0	28	9.0	40	10	-10	-32	...	16	11.7	28	9.6	41	17	-4	-24	16	12.9	25	10.6	40	20	2	-10	-39										
17	9.4	29	7.4	37	3	-26	...	17	10.1	29	7.9	39	17	-8	-18	...	17	11.2	27	8.7	40	13	-10	-32											
18	8.5	30	6.6	35	-5	-5	-	...	18	9.1	30	7.1	-1	-29	-	18	10.1	28	7.8	38	6	-20	...												
19	8.2	30	6.4	34	-8	-5	-	...	19	8.9	30	6.9	36	0	-32	...	19	9.7	28	7.5	38	4	-24	...											
20	8.0	30	6.3	34	-8	-5	-	...	20	8.9	30	6.7	36	-3	-34	...	20	9.5	29	7.3	37	3	-27	...											
21	8.3	24	6.7	36	-8	-39	...	21	8.8	28	6.7	37	1	-32	...	21	9.4	27	7.2	38	2	-28	...												
22	8.5	17	6.5	15	-3	-30	...	22	8.5	20	6.6	20	-4	-32	...	22	9.6	29	7.5	38	3	-25	...												
23	9.2	9	7.1	0	-19	-	...	23	9.0	14	7.0	9	0	-23	...	23	9.8	25	7.5	31	5	-21	...												
24	9.6	4	7.5	-12	1	-14	-32	...	24	10.3	10	7.9	-5	-11	-28	...	24	9.8	19	7.6	17	4	-18	...											

VK EAST — EUROPE (Long Path)												VK SOUTH — EUROPE (Long Path)												VK WEST — EUROPE (Long Path)											
UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9									
1	8.9	-6	6.7	-30	0	-10	-23	...	1	8.3	-12	6.3	-26	1	-13	-28	...	1	8.0	-36	6.1	-11	-21	-35	...										
2	9.5	-3	7.2	-25	1	-9	-22	...	2	8.9	-6	6.8	-23	0	-13	-28	...	2	8.5	-17	6.6	-35	3	-12	-35	...									
3	9.9	-2	7.6	-19	3	-8	-22	...	3	9.2	0	7.1	-16	0	-14	-30	...	3	8.7	-12	6.8	-31	3	-13	-27	...									
4	9.6	-5	5.4	-11	-1	-10	-26	...	4	8.8	-6	6.9	-26	-1	-16	-36	...	4	8.4	-10	6.0	-24	-1	-16	-32	...									
5	6.5	-1	6.7	-19	-8	-18	-38	...	5	7.8	4	6.1	-1	-5	-28	...	5	7.4	-11	5.8	-15	-6	-24	...											
6	8.1	11	6.4	8	-2	-24	...	6	7.4	9	5.8	9	-10	-39	...	6	7.0	-8	5.5	-18	-9	-31	...												
7	9.1	22	7.2	23	4	-19	...	7	8.1	21	6.4	3	-7	-37	...	7	7.6	0	6.0	-2	-8	-31	...												
8	11.8	25	9.4	32	17	0	-17	...	8	10.3	22	8.2	6	-14	-36	...	8	9.5	10	7.6	3	0	-18	-37											
9	12.8	28	9.8	30	12	9	-3	-2	...	9	12.1	25	9.4	33	18	1	-1	...	9	12.4	15	10.0	10	11	3	-2	-16								
10	16.3	12	12.8	-36	11	10	5	-3	...	10	11.5	15	7.4	-9	-14	-33	...	10	11.7	16	7.5	12	4	-15	-34										
12	17.7	9	14.0	-	5	9	-7	...	12	13.9	12	10.9	-17	11	5	-4	-18	...	12	10.1	9	7.7	-2	4	-11	-27									
13	16.9	4	13.7	-	-1	5	4	-1	...	13	15.7	9	11.1	-	7	8	4	-3	...	13	14.1	6	11.1	-	4	-18									
14	16.0	0	12.4	-	-4	2	1	-3	...	14	15.0	2	10.4	-	1	4	1	-6	...	14	16.2	5	11.0	-	2	-4									
15	15.1	-4	11.6	-	-7	0	0	-5	...	15	14.3	-2	9.0	-	3	1	0	-7	...	15	15.5	10	10.7	-	4	1	-6								
16	14.5	-6	10.4	-	-1	0	1	-6	...	16	13.9	-5	8.6	-	5	0	-5	-16	...	16	14.8	1	11.1	-	1	-8									
17	12.2	-7	10.7	-	1	1	11	-2	...	17	14.0	9	9.9	-	3	7	9	7	...	17	12.8	2	11.0	-	1	-8									
18	11.2	-8	10.4	-	1	10	11	-23	...	18	11.7	15	11.7	-	1	10	11	8	7	...	18	12.2	1	11.6	-	1	-25								
19	11.2	-10	10.0	-	24	24	8	-29	...	19	14.4	26	10.8	-44	27	11	-3	-23	...	19	12.8	26	9.6	43	20	0	-17								
20	12.6	28	9.3	22	23	12	-14	-37	...	20	13.4	27	10.0	43	24	7	-9	-31	...	20	12.0	27	8.9	42	16	-5	-25								
21	11.8	26	8.7	33	17	-1	-19	...	21	12.4	27	9.4	40	20	1	-16	...	21	11.2	27	8.4	41	13	-11	-33										
22	11.0	21	8.5	17	17	-5	-23	...	22	12.2	23	9.1	25	16	0	-17	...	22	11.0	28	8.2	41	12	-12	-35										
23	11.5	15	8.7	2	11	-3	-18	...	23	11.9	18	9.0	12	13	-2	-18	...	23	10.7	25	8.2	33	10	-13	-36										
24	10.4	7	7.8	-12	5	-9	-24	...	24	10.4	10	7.9	-5	-10	-27	...	24	9.6	18	7.3	17	1	-23	...											

VK EAST — USA/CARIBBEAN												VK SOUTH — USA/CARIBBEAN												VK WEST — USA/CARIBBEAN											
UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9	UTC	MUF	dBU	FOT	7.1	14.2	18.1	21.2	24.9									
1	15.3	4	11.5	3	3	-3	-13	-	1	16.9	5	12.8	-	-	2	5	-1	-	-	1	15.1	11	3.3	0	3	-9	-								
2	14.9	5	10.0	-28	5	3	-15	-34	...	2	14.5	5	10.0	-	-	3	5	-1	-	-	2	13.0	0	9.8	-	3	-17	-							
3	11.9	5	9.0	-28	5	3	-15	-34	...	3	13.1	9	9.9	-33	7	1	-9	-24	...	3	12.7	3	8.7	-37	1	-24	-								

# HAMADS

## TRADE ADS

● AMIDON FERROMAGNETIC CORES: For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please ... 14 Beanya Ave Kiama). Agencies at: Geoff Wood Electronics, Sydney; Webb Electronics, Albury; Assoc TV Service, Hobart; Truscotts Electronic World, Melbourne and Mildura; Apila Tango Products, Perth.

● WEATHER FAX programs for IBM XT/ATs \*\*\* "RADFAX2" \$35-00, is a high resolution shortwave weatherfax. Morse and RTTY receiving program. Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSB, HF radio and RADFAX decoder. \*\*\* "SATFAX" \$45-00, is a NOAA, Meteor and GMS weather satellite picture receiving program. Needs EGA or VGA & WEATHER FAX PC card, + 137 MHz Receiver. \*\*\* "MAXISAT" \$75-00 is similar to SATFAX but needs 2 MB of expanded memory (EMS 3.6 or 4.0) and 1024 x 768 SVGA card. All programs are on 5.25" or 3.5" disks (state which) plus documentation, add \$3-00 postage. ONLY from M Delahuntly, 42 Villiers St, New Farm QLD 4005. Ph (07) 358 2785.

● THE ANTENNA EXPERIMENTER'S GUIDE, By Peter Dodd G3LDO. 200 Pages, 120 illustrations, includes material not previously published. Building simple RF test equipment for measuring resonance, Z and field strength. Antenna optimising & VHF modelling. Computer measurement & mathematical modelling. Masts and experimental antennas. Price \$AUS25.00, Inclusive of P & P & Airmail. Cash SAUS or Visa. Obtainable, Peter Dodd, 37 The Ridings, East Preston, West Sussex BN16 2TW, U.K.

● STOCK REMNANTS, BUSINESS CLOSED. All brand new Icom equipment with full warranty. IC-R7100 VHF/UHF receiver \$2,000, AH-7000 Disccone Antenna \$200, TV-7100 TV Adaptor for R7100 \$250, IC-707 HF Transceiver \$1,500, IC-728 HF transceiver \$1,650, IC-R72A Receiver 0.1-30 MHz \$1,250. AH2A Automatic Antenna Tuner \$600, AH2B Mobile Antenna \$150, IC-2S20 m Portable Transceiver \$300, SM8 Base Microphone \$160, SM20 Base Microphone \$180. Brian Stares, PO Koondrook, VIC 3580 Phone (054) 53 1300.

## FOR SALE ACT

● YAESU FT200 HF txvcr w/FTV650 6 m txvtr, 10 m preamp, AC and DC psus \$200; BWD 421A dual-trace 12.5 MHz CRO (u/s) \$30; TCA1674 6 m FM txvcr (\$2,656 fitted) \$10; TWO TCA1675 txvtrs \$5 each; STC132 60 W 2 m FM base txvcr, 5 ch fitted, scanning Rx, ncont \$30; ST5 RTTY demod & loop psu \$5; AMSTRAD PC1512 (mono) w/books, software etc \$50; AMSTRAD PC2086 w/books & software, but no HD or mon \$30; VIM 6502 s/board computer, books, appl notes, ASCII kb & monitor \$10;

DATAPRODUCTS 8012 NLQ/graphics printer (minor u/s) \$30; MONO EGA monitor \$10; HP3439A DVM with HP3445A \$20; ORIGINAL software w/manuals, licenses, boxes, etc. Drawperfect & WP Office \$50; MS Fit Sis 3.0 \$20; MS FS Scenery Designer \$20; HARVARD GRAPHICS v3.0 \$80, v2.3 \$50; VENTURA Publisher for Windows Gold v3.0 \$150; QUATTRO PRO v4.0 \$80, v3.0 \$20, v2 \$10; PARADOX SE v1.0 \$30; ADOBE Type Manager for Win \$20; PUBLISHER'S Powerpack v2.0 DOS (scalable fonts for WPerf, LPerf, MSWord, MSWorks) \$20; Free to good homes; Heathkit Sixer (6 m AM); model 15 teleprinter w/p-tape and loop psu. Moving QTH, prices OONO. Mark VK6QI/1 (06) 259 1995.

## FOR SALE NSW

● EIMAC tubes 4CX1500B \$95; CHANGE OVER RELAYS ceramic frame new \$40; MEGGER & leads good condition \$175; VACUUM relay Jennings & mount \$55; FILAMENT transformer Gresham 2/6.5 V 12 amp new oil filled \$50. Plus freight. Ron VK2DTR (02) 918 3835.

● KAYPRO portable computer 10 M HDD lots of legal software \$450; CITIZEN LSP-10 printer \$125; HEWLETT PACKARD Vectra computer 1.44 M & 360K FDD \$275; NEW valves 807 \$10, EF50 \$5. SASE List. VK2WS QTHR (067) 75 2158.

● FRG-9600 Software for EGA/VGA PC, APOSRCR fast search with disk/printer logging, APOSAN multiple scan windows, disk frequency data base, disk/printer logging, CAT/RS232 interface included, \$195 both. Tony Richardson VK2APIO (02) 310 0426.

● KANTRONICS KPC3 VHF TNC with cables and program \$200. Steve VK2YR (02) 821 1803.

● LINEAR 2 m Tokyo Hi-power HL-180V, all modes, switchable power 10W/100W, switchable pre-amp, requires 13.8 VDC, as new, never installed \$650; STANDARD CNB161 nicad battery pack 700 mAh for standard 2 m handheld, good condition \$60; YAESU FT-4700 dual band 2m/70 cm mobile, with front panel separation kit for secure boot mounting (YSK1L long 6 metre cable version), brand new, never unpacked \$1190 (\$400 under price of new model including mounting kit). Brad VK2KOH BH (02) 906 5855 otherwise (018) 640 377.

● DECEASED ESTATE. RACAL Universal counter 12 MHz type SA535 (not working); AWA Harmonic generator type 10A50065 shn 92; NO NAME (?) Kilovolt meter MCCEES 1944 shn 732; GENERAL Radio Co inductance bridge type 667-A shn 518; BRUEL & KJAER deviation bridge type 1504 shn 85225; RADIO equipment Uniscope (ex DCA shn 32) shn 189; MEGA 500 volts shn 970573; ZENER diode tester (home brew) well made piece of gear; AWA marker generator type A51740 shn 130; NO NAME direct current ammeter (Dept Def) Vicrail (?);

HOME BREW digital frequency meter (well built) blue case; KEITHLEY Instruments (Clev, Ohio) guarded differential voltmeter model 660A shn 37693; SIEMENS level meter 200 — 620 kHz model no D2055; KLIRRANALYSATOR 30 Hz to 50 kHz model KLA 48 shn 7480F; MUIRHEAD resistance box type A-25-LS shn 162374; PLESSEY telegraph distortion measuring set Tx shn 177 5CBV, similar piece of equipment NO description, only identification ATE British patent No. 6521126; FAIRCHILD Camera & Instrument Corp, signal generator TS-452 A/U shn 189; MISSION Radio heterodyne frequency meter type CKB-74028 4 shn 6086 (M13) with calibration book; MATSUNAGA MFG Co Ltd slide regulator (VARIAC) type SD 282.1; BERCO Rotary Regovolt (VARIAC) 2 amp type 42A shn 6648; HICKOK model 133B multimeter shn 5029F; PHILIPS PseudoRandom Generator O model 4 shn 7522 210 0050; HOME BREW variable power supply 0.2-4 volts approx 2 amps; TEKTRONIX type 422 oscilloscope shn 006315 (with instruction manual & probes); HOME BREW variable power supply 5 volts; TMC dial & telegraph impulse sender type DATIS 101 shn 52; HEATHKIT digital IC tester model IT-7400; ROHDE & SCHWARZ Polyskop III type SWOB BN 42427 (inst book); FAIRCHILD 766H/dual trace type 79-02A shn 7997; FLUKE differential volt meter model 825A shn 1653; SYSTRON DONNER counter timer model 1034 shn 100; GENERAL Radio Mass, modulator pulse generator type 1395-A shn 334; HEWLETT PACKARD model 214A pulse generator shn 41401192; SCHOMANDL KG Munchen (Philips-TMC) type ND1M + Q2 shn 8710; BALLANTINE Laboratories Inc direct capacitance meter model 520 shn 679; MARCONI Instruments beat frequency oscillator model TF195M shn B229; TELEQUIPMENT oscilloscope type 543 shn 33101; SOLARTRON Digital voltmeter model LM1620 200 mv-1 kV shn 200054; MARCONI Instruments signal generator type TF144G shn B317; SEFRAM Galvanometer type GT1; SE Laboratories Ltd UV recorder 3006 model shn 758/2; SIEMENS 0.2-160 kHz/level oscillator W222 shn 6808323; PHILCO Sierra Electronic Operation envelope delay test set model 340B shn 629; PHILIPS levelmeter LF 30 c/s 15-kc/s HF 4 c/s-664 kc/s STM434/20 shn 18; PHILIPS Attenuator unbalanced 600 ohm type STM 604/10; PHILIPS PM 2454 AC- millivoltmeter 2 Hz-2 MHz shn B2809; HEWLETT PACKARD 522B electronic counter shn 249-05810; DAWE type 441A wide range oscillator shn 1101; YAESU frequency counter 30-200 MHz shn 5C 416115; MICOVAC electronic test meter shn 22402c; PHILIPS voltmeters model GM6012 shn BF 6126, model GM6020 shn D 2689, model 6025 shn D852; BWD model 506 Oscilloscope shn 35800. All offers to WIA NSW Division, PO Box 1066, Parramatta NSW 2124, or phone Michael (02) 626 9288.

## FOR SALE VIC

- TH3MK3 Triband antenna with HAM-M rotator and connecting cables \$450. Allen VK3SM (03) 386 4406.
- KENWOOD TS43X HF xcvr with FM430 also AM filter mic mobile kit and original packing very little on air use \$1325. Graeme VK3BRX (03) 390 8088.
- ICOM 24AT dual band handheld plus BP84 battery pack & extras \$400; BAYSIDE QTH 3 bdr brick plus shack, sea view, Nally tower, 125k. Ted VK3TG QTHR (052) 59 3225.
- UNIDEN 2510 10 m all mode transceiver rarely used \$190. J Glenn VK3AQI (053) 49 3064.
- CUSHCRAFT R7 HF vertical antenna complete with spare hardware and instructions \$700 ono. Denis VK3BGS QTHR (03) 689 8097 or (018) 058 974 after 6 pm.
- TOWER 60 Ft triangular 3 sections free standing just perfect for your new 40 meter Yagi \$400 ono; SATELLITE dish 4 m good condition \$600 ono. Brian VK3EO (03) 366 7707.
- DECEASED ESTATE OF VK3IW. ICOM IC-751A HF transceiver, internal p/s, mic, audio freq sig readout, \$1,300; ICOM RC-10 frequency controller \$50; ICOM SM-8 desk microphone and inst. manual \$50; ICOM IC-2KL solid state HF linear amplifier and inst. manual \$1,500; BENCHER Morse paddle \$50; EMOTATOR rotator model 1103MSAX and manual \$400; COAXIAL Cable RG-213/U 50 Ohm 34 metre length \$68; KENWOOD SW-100B SWR power meter \$100; SBE Sidebander IV 23 channel CB modified, would suit conversion to 10 metres \$100. Geoff VK3BGT (059) 775 824.

- YAESU FT7 vgc with manual, mic, mobile mount \$380; BENCHER paddle as new \$100. Bill VK3BR QTHR (03) 584 9512.
- KENWOOD TV502 2 m SSB xverter suits TS520/S/B20, EC \$150; DG5 freq display for TS-520S \$150; BENDIX microwave devices VHF/UHF pwrlswr meter 120 watt FSD "N" connectors \$75. Dowkey coax relay 12 V DC "N" connectors \$25. Ron VK3OM QTHR (059) 44 3019.
- TRIBAND BEAM TH3Jr new in box \$450. PacCom TNC-320 VHF/HF packet modem \$300 Ron VK3AEO (03) 707 3405.

## FOR SALE QLD

- YAESU FT102ZD transceiver \$600; HEATHKIT SB200 linear uses 572Bs \$400; SWAN 500 HF transceiver 230XC PSU 12V inverter electrovoice mike VGC. Peter VK4APD QTHR (07) 397 3751 AH.
- VALVES for amateurs, restorers, collectors. Some in cartons, octals, novals, metals, all tested. Sockets, ceramics, shields. Send 9" x 4" SASE for new list. Reduced prices. Ted VK4YG PO Box 245, Ravenshoe Qld 4872, (070) 97 6387.
- KENWOOD TS-120S HF xcvr in perfect working order, includes desk mic & handbook s/n 0012234 \$350 ono. Phil VK4BVM QTHR (071) 59 9757.
- POWER SUPPLY/BATTERY CHARGER ELTEC ET21CT, 50 V presettable regulated (switch mode) power supply up to 12.5 amps. Prof quality design incl monitoring, alarms & LED bargraph output current indicator. Compact. As new with performance test sheet. S280. Gary VK4AR QTHR (07) 353 1695

## FOR SALE SA

- YAESU FT411 2 m handheld with accessories, as new, original carton s/n 9D080112 \$400 ono; BP270 70 watt solar panel, new, never used \$500 ono; PBC1216 16 amp regulator to suit \$70 ono. John VK5BKBE QTHR (08) 250 7259.

## FOR SALE TAS

- NATIONAL RDC101D HF transceiver plus ADCV1011 National VFO \$1200; JRC NRD515 all wave receiver 24 memory unit NHD515 \$950; YAESU FT200 transceiver plus speaker supply \$300. Fred VK7FC QTHR (002) 231 485.

## WANTED NSW

- ANY IDEAS both practical and theoretical or any unwanted accoutrements for sale to encourage interested high school students in forming amateur radio group in town country. Pat VK2GRO QTHR (069) 534 730.
- HF LINEAR amplifier; KENWOOD SM-220 station monitor. Malcolm VK2BMS QTHR (02) 257 4583 BH or (02) 958 1114 AH.

## WANTED VIC

- CIRCUIT Seacom 75A marine txvr cost covered. Willem VK3BTQ QTHR.
- MARCONI termination unit for TF995 B/5 sig gen to provide 50 & 70 ohm outputs. Ron VK3OM QTHR (059) 44 3019.

## MISCELLANEOUS

- THE WIA QSL Collection (now Federal) requires QSLs. All types welcome especially rare DX pictorial cards special issue. Please contact Hon. Curator Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765, Tel (03) 728 5350.

ar

# Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.

\*Eight lines per issue free to all WIA members, ninth line for name and address. Commercial rates apply for non-members. Please enclose a mailing label from this magazine with your Hamad.

\*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.

\*Copy typed or in block letters to PO Box 2175,

Caulfield Junction, Vic 3161, by the deadline as indicated on page 1 of each issue.

\*QTHR means address is correct as set out in the WIA current Call Book.

\*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.

\*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.

Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re-sold for merchandising purposes.

Conditions for commercial advertising are as follows: \$25.00 for four lines, plus \$2.25 per line (or part thereof). Minimum charge — \$25.00 pre-payable.

State: .....


Not for publication:

Miscellaneous

For Sale

Wanted

Name: ..... Call Sign: ..... Address: .....

## TRADE PRACTICES ACT

It is impossible for us to ensure the advertisements submitted for publication comply with the Trade Practices Act 1974. Therefore advertisers and advertising agents will appreciate the absolute need for themselves to ensure that, the provisions of the Act are complied with strictly.

## VICTORIAN CONSUMER AFFAIRS ACT

All advertisers are advised that advertisements containing only a PO Box number as the address cannot be accepted without the addition of the business address of the box-holder or seller of the goods.

## TYPESETTING AND PRINTING:

Industrial Printing and Publishing Pty Ltd, 122 Dover Street, Richmond, 3121.  
Telephone: 428 2958

## MAIL DISTRIBUTION:

R L Polk & Co Pty Ltd, 96 Herbert St, Northcote, Vic. 3070. Tel: (03) 482 2255

## CONTRIBUTIONS TO AMATEUR RADIO

Amateur Radio is a forum for WIA members' amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of AR. A photocopy is available on receipt of a stamped, self addressed envelope.

## BACK ISSUES

Available only until stocks are exhausted. \$4.00 to members, which includes postage within Australia.

## PHOTOSTAT COPIES

When back issues are no longer available, photocopies of articles are available to members at \$2.50 each (plus \$2.00 for each additional issue in which the article appears).

The opinions expressed in this publication do not necessarily reflect the official view of the WIA, and the WIA cannot be held responsible for incorrect information published.

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## HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary  
Wireless Institute of Australia  
PO Box 2175  
Caulfield Junction, Vic 3161

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms:.....

.....

Call Sign (if applicable):.....

Address:.....

.....

State and Postcode:.....

## WIA Morse Practice Transmissions

VK2BWI Nightly at 2000 local on 3550 kHz

VK2RCW Continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm

VK3COD Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz

VK3RCW Continuous on 144.975 MHz 5 wpm, 10 wpm

VK4WIT Monday at 0930 UTC on 3535 kHz

VK4WSS Tuesday at 0930 UTC on 3535 kHz

VK4WCH Wednesday at 1000 UTC on 3535 kHz

VK4AV Thursday at 0930 UTC on 3535 kHz

VK4WIS Sunday at 0930 UTC on 3535 kHz

VK5AWI Nightly at 2030 local on 3550 kHz

VK5RCW Continuous on 144.975 MHz, 5 wpm to 12 wpm

VK6WIA Nightly at 1930 local on 146.700 MHz and nightly (except Saturday) at 1200 UTC on 3.555 MHz.

# WIA Divisional Bookshops

The following items are available from your Division's Bookshop  
 (see the WIA Division Directory on page 3 for the address of your Division)

Ref	List Price	Ref	List Price
<b>ANTENNAS</b>			
Ant. Compendium Vol 2 Software 5.25" IBM Disk	\$20.00	Morse Code — The Essential Language	BR223 \$16.00
Antenna Compendium Vol 2 — ARRL	\$32.00	Morse Code Tapes Set 1: 5-10 WPM — ARRL	BR331 \$24.00
Antenna Impedance Matching — ARRL	\$52.00	Morse Code Tapes Set 2: 10-15 WPM — ARRL	BR332 \$24.00
Antenna Note Book W1FB — ARRL	\$17.00	Morse Code Tapes Set 3: 15-22 WPM — ARRL	BR333 \$24.00
Antenna Pattern Worksheets Phi of 10	\$3.00	Morse Code Tapes Set 4: 13-14 WPM — ARRL	BR334 \$24.00
Easy Up Antennas	\$78.25	Morse Tutor 3.5" IBM Disk	BR167A \$20.00
G-QRP Antenna Handbook — RSGB — 1992 1st Edition	\$22.50	Morse Tutor 5.25" IBM Disk	BR167B \$20.00
HF Antenna Collection — RSGB	\$10.00	Morse Tutor Advanced 3.5" IBM Disk	BR328A \$40.00
HF Antennas for all Locations — Moxon — 2nd Edition	\$44.00	Morse Tutor Advanced 5.25" IBM Disk	BR328B \$40.00
Antenna Compendium Vol 1 — ARRL	\$26.00		
Novice Antenna Notebook — DeMaw W1FB — ARRL	\$16.00		
Physical Design of Yagi — 3.5" IBM Disk	\$20.00		
Physical Design of Yagi — 3.5" Mac Disk Excel Format	\$20.00		
Physical Design of Yagi 5.25" IBM Disk	\$20.00		
Physical Design of Yagi Antennas — The Book	\$20.00		
Practical Antennas for Novices	\$19.00		
Practical Wire Antennas — RSGB	\$15.00		
Reflections Transmission Lines and Antennas — 5.25" IBM	\$32.00		
Reflections Transmission Lines and Antennas — ARRL	\$20.00		
The Antenna Handbook — ARRL — 1994 edition with disk	\$20.00		
Transmission Line Transformers — ARRL	\$40.00		
Yagi Antenna Design — ARRL	\$40.00		
<b>HANDBOOKS</b>			
ARRL Handbook — 1995	\$66.00	Amateur Radio Awards Book — RSGB	BR297 \$25.00
Electronics Data Book — ARRL	\$32.00	Amateur Techniques — GSVA — RSGB	BR393 \$36.00
Radio Communication Handbook — RSGB	\$44.00	DIXCC Companion — How to Work Your First 100	BR345 \$16.00
Radio Theory For Amateur Operators — Swanson — 2nd Ed	\$47.50	DIXCC Country Listing — ARRL	BR386 \$5.00
Space Radio Handbook — GM4HU — RSGB	\$47.00	Locator Map of Europe — RSGB	BR396 \$6.00
World Radio TV Handbook	\$40.00	Log Book — ARRL — 9" x 11" Wire Bound	BR202 \$9.00
<b>HISTORY</b>			
200 Meters and Down 1936 — ARRL	\$21.00	Low Band DXing — John Devoldere — 2nd Edition 1994	BR195 \$45.00
50 Years of the ARRL — 1981	\$8.00	Operating Manual — ARRL — 4th Edition	BR192 \$48.00
Bright Sparks of Wireless	\$44.00	Operating Manual — RSGB	BR339 \$31.00
Dawn of Amateur Radio	\$58.00	Passport to World Band Radio	BR346 \$45.00
World at Their Fingertips	\$93.00	Prefix Map of the World — RSGB (laminated)	BR397 \$25.00
<b>INTERFERENCE</b>			
Radio Frequency Interference — ARRL — 1992 Edition	\$40.00	RTTY/MOTOR Companion ARRL 1st Ed 1993	BR45 \$21.00
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<b>MISCELLANEOUS</b>			
Amateur Radio for Beginners — RSGB	\$13.50	Transmitter Hunting	BR222 \$43.00
Beyond Line of Sight	\$26.40	World Grid Locator Atlas — (Maddenhead Locator) — ARRL	BR197 \$13.00
Design Note Book W1FB — ARRL	\$20.00		
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Ham Radio Communications Circuit Files	\$24.95		
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QRP Classics — ARRL — QST	\$32.00		
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Solid State Design — DeMaw — ARRL	\$32.00		
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Understanding Basic Electronics	\$37.50		
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Morse Code Tapes Set 2: 10-15 WPM — ARRL	BR332 \$24.00		
Morse Code Tapes Set 3: 15-22 WPM — ARRL	BR333 \$24.00		
Morse Code Tapes Set 4: 13-14 WPM — ARRL	BR334 \$24.00		
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Amateur Techniques — GSVA — RSGB	BR393 \$36.00		
DIXCC Companion — How to Work Your First 100	BR345 \$16.00		
DIXCC Country Listing — ARRL	BR386 \$5.00		
Locator Map of Europe — RSGB	BR396 \$6.00		
Low Band DXing — John Devoldere — 2nd Edition 1994	BR195 \$45.00		
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